SUMMARY AND CRITIQUE OF AVAILABLE DATA ON THE PREVALENCE AND ECONOMIC AND SOCIAL COSTS OF VISUAL DISORDERS AND DISABILITIES

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

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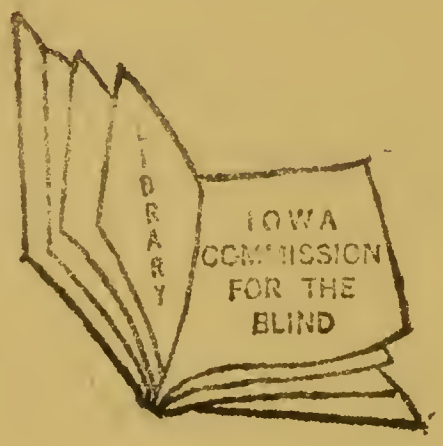

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FINAL REPORT

SUMMARY AND CRITIQUE OF AVAILABLE DATA ON THE PREVALENCE AND ECONOMIC AND SOCIAL COSTS OF VISUAL DISORDERS AND DISABILITIES

Prepared for

U.S. Department of Health, Education, and Welfare
Public Health Service
National Institutes of Health
National Eye Institute
Bethesda, Maryland 20014

Under

Program Evaluation Contract Number NO1 EY 52108

by

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We would also like to thank the many individuals in the Federal, State and private agencies visited during this study for their willingness to share their time, knowledge, insight and data on visual disorders.

The report also reflects the knowledge and experience of the consultants on this project: Dr. Richard Hoover, who carefully reviewed each of the phases of the project, and Theodore Woolsey, without whose direction, guidance and input this project could not have been accomplished.

Mr. John I. Cahill was director of the project for Westat. Dr. Edward Bryant, President, was the senior advisor, and Mark Adelman was the economist. The Westat team is grateful to Ms. Krista Koziol, Research Associate, whose assistance, advice and support were most necessary for the completion of this study.

1. INTRODUCTION

1.1 Background for Study

The National Eye Institute (NEI) has the responsibility for conducting and supporting research in the area of visual disorders. As an outgrowth of this, NEI has a need for current, reliable statistics on the magnitude, distribution and national costs of the diseases and impairments to which its research is directed. This information is used for program planning, setting research priorities and developing new social policies for the visually impaired.

Although the Institute recognizes that there are already many compilations of incidence and prevalence statistics on visual disorders, NEI believes that the existing information is not satisfactory because it is "conflicting, poorly documented, and ambiguous." Research on blindness and other vision impairments suffers from a lack of consensus on definitions (Goldstein, 1975; Hoover, 1964).[1]

As the report on Blindness and Services to the Blind in the United States, by the Organization for Social and Technical Innovation, Inc. (OSTI), so aptly points out, the term "blindness" is commonly used as an administrative classification, one which serves to determine eligibility for services from the blindness system rather than a definition of absolute visual impairment. Legal and functional definitions of blindness are often incompatible with one another.

Along with these definitional problems comes a multiplicity of sources regarding who is visually impaired. While the Model Reporting Area, a voluntary association of state blindness registers whose aim is to collect uniform and reliable data on

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[1] For references cited in the text of the report, see Appendix E.

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blind persons, outlined the number of blind persons in the United States, other sources such as the National Health Survey data estimate a prevalence rate far different than that of the MRA (OSTI, 1968). Undoubtedly, what is needed is a thorough, knowledgeable review of existing data sources with documentation as to their methodology, definitions, and completeness.

Under contract from the National Eye Institute, Westat, Inc. has undertaken a "Summary and Critique of Available Data on Prevalence and Economic and Social Costs of Visual Disorders and Disabilities."

1.2 Major Areas of Work (Summary)

In an effort to accomplish this task, Westat saw its role in this study to be threefold: (1) identification and location of data sources relevant to the purposes of the study; (2) methodological and general evaluation of existing data; and (3) estimation of the incidence and prevalence rates of visual disorders and cost factors associated with them.

To carry out these roles we began with a thorough search and review of available published and unpublished literature related to incidence, prevalence and socio-economic costs of eye disorders. Data Banks of the National Technical Information Service and MEDLARS II, a system with a data base of 2,500 bio-medical, non-governmental journals, were of primary use here. In addition, contact with sources known to collect information on visual disorders or agencies known to offer services or financial support to the visually handicapped was made in an effort to obtain data. Personal visits and/or questionnaires were used in this endeavor.

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Gathering all these data sources together, the resulting yield was large. However, after appraising the literature in terms of availability of current information, adequacy of methodological documentation, size of sample surveyed, demographic breakdowns and applicability of data to the U. S. population, it was found to be diffuse, ambiguous and lacking in any comprehensive picture (Cohen, 1973; Goldstein, 1975; Portney, 1974). However, for all variables reviewed there were exceptions to the rule (Hatfield, 1973; Trouern-Trend, 1968).

Available data sources, on the other hand, fell into two roughly established categories: those having a mission to provide statistical information (e.g., National Center for Health Statistics) and those for whom the performance of this task was likely to be a burden (e.g., Health Insurance Plan of Greater New York). In each case, however, the data collection process was plagued by such things as sample size, comparability in classification and suitability of statistics to the needs of NEI.

Nevertheless, Westat was able to produce statistics which, we feel, should meet at least the immediate needs of the Institute. Key incidence figures for acute conditions and injuries were based on national estimates of total incidence of acute conditions and total incidence of injury to the eye from averages of four years of data (1970-73) from the Health Interview Survey (NCHS). Chronic disease incidence figures were averages of five years (1970-1974) of national estimates of first visits from the National Disease and Therapeutic Index (NDTI). Both data sets employed were chosen for their accuracy in producing best estimates from available data sources. HIS was best in producing national sample statistics on acute conditions and injuries, though not for chronic conditions with gradual onset. NDTI data, on the other hand, produced such estimates on chronic eye conditions through the use of first visit data. These visits, however, could not be taken to represent new cases in any precise way: a visit was counted as many times as there were separate

diagnoses; designation of a first visit was dependent on reporting physician's knowledge of previous patient experience; and it seemed to be possible for a "first visit" patient to have been seen earlier for the same condition if it had been more than a year earlier.

Prevalence figures for the total civilian population were, for the most part, tied to data from the Health Interview Survey (NCHS), and in the case of blindness, to MRA statistics. HIS, however, excluded as a data base the institutional population; thus in our measurement of national prevalence we had to make use of data from an NCHS Nursing Home Survey to estimate prevalence in that part of the total institutional population that was in nursing homes and other institutions believed to be similar to the nursing home in the characteristics of their patients. The remainder of the institutional population was assumed to have the same prevalence rates as the non-institutional population. In any case, the weakest part of these estimates had to do with prevalence in the institutional population. Estimation of prevalence rates was based on an "eye affection" classification used by MRA. With the addition of one additional category for minor impairment we were then able to use the same affection category for all three levels of disability. Finally, it should be noted that estimates on the amount of blindness may be underestimated. State registers on which our MRA statistics were based probably miss certain cases in the population.

For estimates of medical care services several data sources were used. The National Ambulatory Medical Care Survey (NAMCS) from NCHS and the National Disease and Therapeutic Index (NDTI) provided statistics on number of office visits by diagnostic category. The Hospital Discharge Survey (HDS) and the Professional Activities Study (PAS) were used as a basis for making estimates on the number of hospital discharges. In addition, HDS data were used as a basis for estimating number of days of care from these hospitals; and PAS were used separately to estimate the number of

operations performed on the eye. Finally, data from the Kaiser Foundation were used to estimate in more detail hospital discharge data for eye diseases and injuries from a prepaid group practice plan. Despite the use of these data systems, there were still problems in making estimates. Available data from each source were not always for the same year. Visit statistics from the two sources used differed to some extent in covereage and both included only the practices of office-based physicians. There was little or no nationally representative data on procedures other than operations performed in hospitals.

Finally, in the area of direct and indirect costs, our computations were based on a model established by Dorothy Rice in "Estimating the Cost of Illness" (see complete reference in Section 6.1). It should be noted, however, that these costs did not include taxes or transfer payments since this would have involved double counting of the dollars. For detail of sources, see the specific tables. Generally, though, direct costs were based on data from the medical care services section of the report with unit costs applied, thereby totaling $3,603.7 million. Indirect costs, on the other hand, totaled $1,485.2 million and were based on figures from HIS and the 1973-74 Nursing Home Survey, as well as mean earnings data from the Social Security Administration.

2. IDENTIFICATION AND REVIEW OF DATA SOURCES

Within the framework of this section we have outlined the major methods used to canvas the sources of statistics on visual disorders and impairments, as well as the analytical implications of these data sources. Section 2.1 offers a review of Westat's three part approach in investigating the availability of information on visual disorders, and each of the subsections under this heading treats a specific approach used in completing such a task, e.g., review of the literature search, explanation of how we contacted original data sources, etc. Section 2.2 follows with a discussion and analysis of the data provided from the sources outlined in Section 2.1.

2.1 Basic Procedures Used in Locating Data Sources

2.1.1 Explanation of Literature Search

A thorough search and review of available published and unpublished literature related to incidence, prevalence, and socio-economic costs of eye disorders was undertaken by the Westat staff for the purpose of assessing relevant statistical data in the literature. Using a variety of techniques to extract pertinent information, Westat gathered its data sources from two major areas. Initially, computerized literature searches were used to review government and journal articles relevant to the study. In addition, Westat contacted known professionals in the field and asked them to cite the major literature and known data sources. It was felt that by using such a system all areas of the literature would be explored.

Nevertheless, for the purposes of this paper, we have separated references gathered from the two computerized literature searches and material gathered from the contacts. In this section

and Section 2.2.1 all information discussed will refer only to the computerized searches. The other parts of Section 2 will discuss all other literature researched. For a complete listing of these references see Appendix E. Literature listed there is presented alphabetically by author, with source of reference provided.

With regard to the computerized searches, references were initially extracted from the data bank and pertinent articles were read for a preliminary appraisal of relevant statistical data contained therein. A bibliographic citation, a brief summary of content, and a general evaluation of the data's usefulness for our purpose were then recorded on file cards for each entry. Subsequently, each card was coded according to the subject matter discussed (e.g., blindness prevalence, glaucoma incidence, cost of cataract operations). Cards grouped topically provided a convenient and efficient basis by which to judge the quality and quantity of available data from published and unpublished sources in the field.

As indicated previously, Westat used two computerized searches in their effort to review the literature. Initially, Medlars II, a system with a data base from the National Library of Medicine, was used to review 2,500 bio-medical, non-governmental journals and papers published since 1972. Based on areas of interest, key words indexed to the most specific terminology were fed into the computer. Prior to this, however, subject headings had been assigned by library personnel to every significant concept in each of the documents in the system. Using such a system, the computer scans each potential data source and compares our key words of interest with the significant concepts in the article. Articles having significant concepts which match our areas of interest are then cited on a computer printout in bibliographic form.

The Medlars search run by Westat provided bilio-graphic citations in three major areas: epidemiological studies in eye diseases - 120 citations; familial and genetic aspect of eye disorders - 247 citations; and a general reference printout primarily concerned with disability caused by visual disorders, length of hospital stay due to eye diseases, and workmen's compensation cases dealing with visual disorders - 48 citations.

Of these citations, approximately three hundred were reviewed as potential data sources. The remaining number may be accounted for by repetition in one or more subject areas, unavail-ability after three attempts to locate the journal in question, citations in foreign language journals, and citations which proved irrelevant after a scan-edit of references cited.

Westat's second search was with the National Technical Information Service (NTIS). Using a data bank which consisted of approximately 400,000 technical report summaries of documents written since 1964 from all major departments and agencies within the Federal Government, as well as from leading private organiza-tions or individuals with Federal grants or contracts, a compre-hensive in-depth search was performed.

Like the Medlars II search, key concepts were provided by the Westat staff and then fed into the NTIS system. In all, approxi-mately 50 citations were provided by the run under such subject headings as: national incidence and prevalence statistics on specif-ic visual disorders (as listed in the RFP); socioeconomic costs of visual disorders and disabilities; loss of taxes and productivity related to visual disorders and disabilities; medical/custodial care of patients with visual disorders and information related to direct financial assistance or special benefits to the blind and visually disabled.

Unlike the Medlars II search, which provided a listing of bibliographic citations with no content summary, NTIS provided abstracts of the articles cited in the search. On this basis, Westat was able to make an efficient, preliminary review of the references without the necessity of locating and reading each entry from the system. Using such a system, the Westat staff then made a decision whether the article was relevant and if so whether detailed exploration of the source was necessary. Pertinent documents were then obtained from the original source or from the NTIS library.

2.1.2 Contacts and Visits with Original Sources of Data

One of the major methods used for gathering data on visual disorders was contact with sources known to collect information in that area or sources known to offer services or financial support to the visually handicapped. On the basis of prior experience of Westat's staff, we began our data collection effort by pinpointing known sources of data and agencies set up to service those with a visual disorder.

Sources known to collect data on visual disorders fell into three major sectors -- Federal, State, and Private. Each of these sectors dealt primarily with a particular type of data source. Federal agencies were represented by the National Center for Health Statistics (NCHS) and the National Cancer Institute (NCI), both of which are known for their capability in supplying survey data, and also by the Social Security Administration, the Social and Rehabilitation Service, and the Veterans Administration which operate programs of financial benefits or services to persons with visual disabilities. Blindness Registers were to supply information from the state level; and the National Disease and Therapeutic Index (NDTI), as well as the Professional Activities Study (PAS), were

representative of survey capabilities and abstracting systems in the private sector. In the private sector also were health insurance plans which might be expected to have data on enrollees served. (For a complete list of original sources contacted, see Appendix A.)

Initially, the major agencies on this data collection list were contacted and an in-person interview with an agency representative took place. The primary purpose of the interview was to determine the content, accessibility and completeness of the data system. Once the state of the data was determined, each interview then turned towards obtaining any additional sources of data known by the agency.

Sources obtained from these agencies and those which were found to collect data on visual disorders were added to our list of contacts. These new data sources, however, were reviewed through the use of a brief questionnaire (See section 2.1.3 for further explanation.)

In conjunction with a list of known data collection agencies Westat was also concerned with contacting agencies which offered other kinds of services to the visually handicapped. It was felt that even though these agencies did not collect statistical information on individuals with visual disorders, they would be familiar with agencies that did. Westat began this review of service-oriented agencies by initiating contact with places like the American Foundation for the Blind, the National Society for the Prevention of Blindness, and the National Accreditation Council for Agencies Serving the Blind and Visually Handicapped (for a complete list of these agencies see Appendix A). New agencies suggested by the service-oriented agencies were either contacted through the use of a questionnaire, if they were a data collection agency, or contacted by telephone/in-person if they had a service orientation with no data collection capabilities. In all cases we were attempting to assess which agencies had a data collection system and what the content and capability in producing these data were.

2.1.3 Explanation of the Use of the Questionnaire

As a means of making every effort to ascertain the original producers of data relevant to the scope of work outlined in the proposal, Westat initiated a data search via the use of a questionnaire. On the basis of names and agencies compiled from contacts spoken of previously in Section 2.1.2 Westat administered a mail questionnaire to each of the names or agencies on the list. The purpose of this questionnaire was to review and evaluate the various kinds of data collected by these agencies. More specifically, we were interested in establishing which of these data collection systems had data relevant to the needs of our research and which of these agencies would be able to provide us with these data. In all there were four different types of questionnaires used to provide us with this information. The type of questionnaire sent to the individual agencies was dependent on the type of data collection system used by the agency under discussion. For example, the Commission on Professional and Hospital Activities was known to have a system which extracted information from membership hospitals; consequently, Westat requested them to fill out questionnaire D, one which dealt with Hospital Discharge Abstracting Systems. NCHS, on the other hand, conducts the Health Interview Survey (HIS) on an annual basis, and so we sent them questionnaire A, dealing with the Morbidity and Medical Care Surveys and Censuses. (For copies of questionnaires, see Appendix B.)

Once these and all other questionnaires had been returned to the Westat office, they were subjected to systematic processing. Questionnaires were logged in (see Appendix C) and reviewed for completeness and legibility. Telephone contact was made to clear up any problems. Each questionnaire was then evaluated on the basis of availability of information in the needed detail. Sources which met the criteria set down by the Westat staff were then approached by letter. Further explanation as to the needs of the project was provided and copies of table shells outlining the desired information were enclosed.

2.2 Investigation and Analysis of Data Sources

2.2.1 Analysis of the Literature

As Section 2.1.1 has indicated, a thorough search and review of the literature were performed to determine the availability of relevant statistical data. The analytical approach to this review, however, was carried out in terms of the major variables outlined in the proposal, e.g., annual prevalence and incidence rates of a visual disorder in the U.S. population; and direct and indirect costs associated with the visual disorder, i.e., costs associated with lost productivity, and medical and/or custodial care, plus public support payments. Gathering all these sources together, the resulting yield of references from the literature search was large. However, after sorting out and evaluating the sources, the state of the literature itself was found to be diffuse, parochially compartmentalized and lacking in any comprehensive or global perspective. Accordingly, in this section of the report we have selected references which best illustrate the quality and quantity of statistical data found. Moreover, within each of the subject areas we have appraised the data source in terms of general availability of current information, adequacy of methodological documentation, size of sample being surveyed, applicability of data to the U.S. population, and efforts to break down the population under study demographically.

2.2.1.1 Incidence Data

Only a limited number of references dealing with data related to the incidence of specific eye diseases or conditions were reviewed. In all, only fourteen[1] sources contained any report of such information. Of those, there existed considerable variety in the number of cases analyzed, the array of variables surveyed and the methods employed.

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[1]See Appendix E entry numbers 1, 10, 15, 17, 35, 44, 49, 71, 73, 75, 76, 90, 93 and 100.

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Several sources failed to document their definition of the term "incidence" (Snowe, 1973; Alter, 1973); and of the remaining sources, definitional approaches to the concept varied. Hatfield (1973) and Keller (1973) defined incidence as "new cases" and "cases newly diagnosed" respectively, whereas Boone (1973) defined the concept as those cases "reported at onset." As the authors have indicated, the first two definitions provide us with only an approximation of true incidence data and not true incidence statistics, whereas the latter definition examines the actual number of new cases in a specified population.

Even so, several studies have documented trends and patterns in the distribution of visual disorders, but for the most part these studies have dealt with only a small segment of the U.S. population. Over half of the citations dealing with incidence statistics dealt with sample sizes of less than 1,000 (e.g.: Percy, 1972; Portney, 1971; Boone, 1973; Alter, 1973) and of these studies several of the articles dealt with visual disorders particular to a small sample within a social or ethnic group. Portney (1971 and 1974) dealt with the Papago Indians and Alter (1973) dealt with the Oriental population in Hawaii. As a result, valid projections on a national level are next to impossible to make. Nevertheless, Kahn and Hiller (1973) and Hatfield (1973) did report on the incidence rate of blindness in the U.S. population. Hatfield discussed at length the Model Reporting Area and a specific technique by Ralph Hurlin used to document national incidence statistics.

Finally, although an aim of our study was to provide a demographic breakdown of data, such material was lacking. Sample populations were simply not broken down (Ganley, 1973; Orenstein, 1973; Keller, 1973). One suspects that in most cases this is due to the size of the sample and inability to make statistically sound breakdowns from the sample.

2.2.1.2 Prevalence Data

An examination of the literature produced by the searches reveals a greater availability of information on prevalence than was found for data on incidence. Thirty-four[2] references published within the last five years dealt with the prevalence rates of a variety of visual disabilities and eye diseases.

Unfortunately, these references differed greatly in the topics covered, treatment of the material and in the quality of the work completed. Several authors whose contributions reviewed prevalence data failed to document their information adequately. Ellis (1973) made the statement regarding Histoplasmic Choroditis that the highest prevalency rate in the world is in the U.S. along the Mississippi and Ohio Rivers. However, this statement was never supported with any type of statistical data. In addition, Mules (1971) and Bunner (1973) used terms which were poorly defined. Mules inadequately conceptualized the term "loss of vision," and Bunner, in a study on the percent of school children in Ohio with a "vision problem," never defined what he meant by the term. Trouern-Trend (1968), on the other hand, used prevalence figures based on NRA data but in other areas of the report failed to reference where the other statistics came from.

Nevertheless, several studies were adequately documented and do represent successful efforts to provide useful, well documented and clearly presented prevalence data. Hatfield (1973) compiled national statistics on the prevalence of blindness. She provided a demographic breakdown of these figures on the basis of information from the Model Reporting Area. Moreover, Metropolitan Life Insurance (1973) provided figures on the prevalence rate of

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[2]See Appendix E entry numbers 1, 8, 9, 11, 12, 13, 14, 29, 35, 43, 44, 47, 48, 49, 50, 55, 56, 61, 62, 66, 69, 72, 77, 80, 81, 83, 84, 85, 89, 91, 92, 96, 98 and 100.

blindness in the U.S. by comparing rates derived from the MRA to estimate blindness for regional as well as national totals. In their presentation, information by age and sex, as well as etiology of the blindness and the percent of visual acuity, was provided.

Like the literature reviewed under incidence, the majority of references researched dealt with populations having a small sample size. With few exceptions, the size of the data base did not lend itself to making accurate projections on the prevalence rate of visual disorders on a national level. Sanders (1971) used samples with an ethnic base. Rengstorff (1972), Odland (1972) and Marlon (1973) reviewed the military population, and Cohen (1973), Evans (1972), Pearce (1972), and Thaler (1972) researched the institutionalized populations. Hatfield (1973), Metropolitan Life Insurance (1973), Roberts and Dugan (1972), Scanlon and Roberts (1972) were exceptions to this rule. Besides Hatfield's and Metropolitan Life's national estimates from MRA data, Roberts and Dugan studied the visual acuity of non-institutionalized children aged 6-11 years in the U.S., and Scanlon and Roberts studied the same age group in reference to the prevalence of color vision deficiencies in the U.S.

Obviously relevant to the problem of making projections of prevalence on a national level are the studies in which certain eye diseases are found to be statistically higher in particular ethnic populations or age groups, etc.. Studies of this type are by Kalin (1972), a study of glaucoma in the aged; Bettman (1973); and Portney (1974), on the Southwest Indian population and the prevalence of trachoma. In these populations, since the frequency of the disease is higher than in other segments of the U.S. population, the sample size need not be as great in order to make estimates for the particular group studied.

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Finally, in most of the references surveyed, the authors did attempt to break down the populations under study by demographic characteristics. Prevalence data were presented in terms of age, sex and, in certain studies, race characteristics. Studies using the "blind" as a base population were found to describe their population most specifically (Hatfield, 1973 and Trouern-Trend, 1968).

2.2.1.3 Social and Economic Cost Data

While every effort was made to request and obtain information on the subject of social and economic costs of visual disorders, only a few relevant data sources were produced by the two computerized searches. Heimlich (1967) and Trouern-Trend (1968) investigated economic costs associated with blindness. Unfortunately, both were marred by the fact that their data are outdated and at times poorly documented.

Heimlich, in his study for NINDB, specifically reviewed data concerned with a cost estimate of the reduced lifetime earning capacity for the blind and a cost benefit analysis on the development of devices to aid the blind and partially sighted (an area with which our study is not concerned). The usefulness of these estimates is questionable, however, since through the author's own admission, there are insufficient economic data on which to base accurate estimates.

Trouern-Trend also presented a discussion on income lost as a result of blindness, and the economic benefits associated with restoring one's sight. In addition, dollar figures were attached to income sources of the blind, financial reimbursements made to the aging blind, and total expenditures by state agencies for the

blind. The problem with this information, however, is that in a number of cases the author fails to reference where his data comes from, and so if the data were to be used, better documentation of the material would be necessary.

2.2.1.4 Medical Care and Treatment

While Westat requested information from both searches on the medical care and treatment procedures involving eye disorders, we were mainly interested in these procedures in terms of their relation to economic costs. Unfortunately, the citations we received referenced care and treatment on a technical level rather than in terms of any cost-oriented material (Campbell, 1971; Goldsmith, 1972; Cotlier, 1972; Hibbs, 1973 and Kelman, 1973). Of the ten sources cited, all dealt with 200 or less cases, were often demographically undefined, and were parochially structured in their orientation, i.e., no national projections. Even if cost information per case was provided, valid estimates of medical care and treatment procedures on a national level could not possibly be made from these figures.

2.2.2 General Commentary on Sources Contacted

As Section 2.1.2 has indicated, one of the methods used for reviewing available data on blindness and visual disorders was contact by mail, telephone, or personal visit with sources known to collect such data, or known to offer services or financial support or medical care insurance to visually handicapped persons or to those seeking care for diseases or injuries of the eye. We shall document these contacts in detail but in this section a general review of the sources will be presented.

The sources can be roughly divided into two types: a) those recognizing a mission to provide information in statistical form for uses beyond the immediate operational needs of the program; and b) those for whom this mission was an extra burden - a task to be performed only if it could be accomplished without interfering with the major purpose of the program.

Actually, no clean dividing line can be drawn between sources of these types but they could be arranged along a scale according to the degree to which they recognized a mission to serve needs other than their own and devoted internal resources to that mission. At one end would be statistical agencies, such as the National Center for Health Statistics (NCHS), whose major reason for existence is to provide statistics to others, and at the other might be placed private health insurance plans which, quite understandably, do not feel they can use income from premiums to provide this kind of public service. For example, the Health Insurance Plan of Greater New York (HIP) has ceased the routine classification of medical services by diagnosis because they find they don't need it for their internal use. Only if this contract had been able to finance a special coding project would HIP have been able to provide relevant statistics. Other health insurance plans, e.g., some of the Kaiser Foundation Health Plans, did provide some statistics but were limited to data on in-patient hospital services.

The study experienced difficulties, it must be emphasized, at both ends of the scale of sources we have described. However, the difficulties tended to be of a different type depending upon where the source fell on this hypothetical scale. The difficulties with the statistically oriented programs, such as NCHS and the Professional Activities Study (PAS), which has contracted out its public statistical servicing to IMS, America, LTD, and the National Disease and Therapeutic Index (NDTI), also operated by IMS, were more apt to be of a technical type. They

had to do with small sample sizes, comparability in classification, or some sort of unsuitability of the statistics to the NEI's needs.

At the other end of the scale the problems had more to do with the sheer availability of data, or at least the availability of the data at a price that this project could afford to pay.

Despite the considerable length and depth of experience available to the study staff, we were surprised to discover that no data were available on Medicare ambulatory care services (Part B of Medicare) except from a sample survey of households, the sample for which is too small to provide useful data on eye diseases or impairments. Likewise, the problems of digging out statistics on services provided and charges for these services in the Medicaid program proved insuperable in the time and with the funding available in this study. (For example, the office responsible for producing statistics on the services provided to California Medicaid eligibles gave the study a minimum estimate of $4,000.00 to produce the tables Westat requested. No detailed statistics are available at the federal level.)

The Blindness Registers operated by a number of states fall somewhere near the middle of the scale. Because of the tradition of the Model Reporting Area (MRA), they recognize a responsibility to provide statistics in addition to helping to serve the immediate needs of the blind population. Unfortunately, however, according to the consensus among those who helped to establish the MRA and have followed the history of the registers, they have been gradually losing their value as sources of statistics since financial support from the federal government was discontinued. The efforts in the direction of outreach to attempt to cover the entire blind population have declined. Increasingly the registers are simply lists of those who have happened to come within the reach of one or another of the state's programs. The study staff concluded that the statistics for the

period around 1970 were probably better than those currently available, and the basic figures used in the study estimates were those from the end of the MRA reporting era (with certain modifications, which will be described in section 4.2).

Other problems encountered in making use of data from the sources with which the staff made contact and which were sufficiently serious to lead to dropping the effort to secure data were of the following types:

- The source was not really a data system in the usual sense, at least not a system that could produce statistics of incidence or prevalence. An example of this is the Armed Forces Institute of Pathology. An office there collects case histories of difficult therapeutic and/or diagnostic problems, some of which are quite rare. But no effort is made to be complete or representative.

- The source lacked knowledge of the numbers and/or characteristics of an exposed-to-risk population or was suspect as representing an overly atypical experience. The study did receive certain information, for example, from the Wills Eye Hospital in Philadelphia. While the data might be of interest in and of themselves, it was concluded that because of lack of knowledge about the exposed-to-risk population they could not be helpful in estimating the size of the national problem.

- The source covered a population that was too limited geographically or too atypical in other respects to warrant incorporating the data in national estimates, though knowledge of the source may be useful to NEI in other connections. Examples of sources of this sort, which we are sure were not covered completely in our search, are Blue Cross of Northeast Ohio and the Harvard Community Health Plan.

- The data producible from a particular source were too specialized or limited in scope to offer much help in the quest for national statistics on incidence, prevalence, and costs. Of this type there were also a considerable number of examples in the study, and many more could undoubtedly have been found by a more exhaustive search. An instance of a source of this kind are the statistics received from the New York State Department of Labor, Division of Research Statistics, on compensated accidents (under Workmen's Compensation) showing accidents by body part, extent of disability, dollar cost of accidents, and nature of injury.

- The statistics were relevant and useful but a more comprehensive source of data of the same type was available elsewhere. Example: the Missouri Hospital Discharge Data System operated by the Missouri State Center for Health Statistics covers only one state while PAS includes data from short-term general hospitals in the U.S.

This review has concentrated on difficulties and disappointments experienced in making contact with numerous potential data sources of widely varying types. It is not intended that the conclusion should be drawn that the programs investigated were doing an inadequate job. It must be kept in mind that producing statistics suitable to the needs of the Eye Institute and others working in the field of visual disorders and blindness is not a principal responsibility of the officials with whom we were in touch. Nevertheless, our general impression is one of disappointment with what we were able to find.

A further critique of the state of statistics in this area will be found in Sections 3, 4, 5 and 6. For an alphabetic listing of the various information sources with which contact was made by letter, telephone or visit, and a brief summary of the outcome, see Appendix H.

3. DATA ON INCIDENCE

3.1 Evaluation of Existing Data

The statistics on incidence, defined as the number of new cases of a disease or visual impairment with onset in a defined population in a specified interval of time, are undoubtedly the weakest of the four kinds of statistics on visual disorders or impairment with which the study was concerned. This is chiefly due to the fact that the most important conditions, though not the most frequent, from the standpoint of resulting disability and cost to society, are chronic in nature. They are, therefore, often insidious in onset. It is difficult to define a point in time that is the date of onset. Thus, household surveys generally provide inadequate measures of incidence of chronic eye diseases.

Another pervasive difficulty in making use of sample surveys to determine the incidence of diseases in the national population is that of sample sizes. This problem can be brought home by giving a hypothetical example. Suppose there is an eye disease with an annual national incidence of 100,000 cases per year. That incidence would correspond to one of the more common eye disorders. It would by no means be considered rare. Yet this incidence represents roughly one case for every 2,200 person-years of experience in the national population. That is to say one has to follow a samply of 2,200 persons for a year, on the average, to pick up a single case. Few agencies have the resources to deal with samples of that

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size. Even the National Health Interview Survey (HIS) carried on by NCHS, which is the largest health survey of its kind in the world, involves visiting only 42,000 households containing about 134,000 persons in the course of a year. However, since the family respondents have been found to provide reliable information on new cases of illness for no more than the two weeks preceding the visit (because of problems of recall), there are not 134,000 person-years of experience covered in a year's surveying but only about 1/26th of that, or about 5,150 person-years. Thus, one would expect to pick up no more than 2 or 3 new cases of our hypothetical eye disease per year of the survey.

Criticism of a survey such as HIS is sometimes directed at the quality of the information which can be provided by lay respondents. We believe this criticism misses the point. Actually, if a member of the family has been diagnosed as having glaucoma, the respondent is perfectly capable of passing that information on without error to a trained interviewer who asks about it. But even a survey of this magnitude will find so few new glaucoma cases that it might require the consolidation of 10 years of sampling to provide an even passably reliable national estimate!

The insidious nature of the onset of chronic illness makes for a subtler error also. Typically, symptoms of trouble make themselves known and the individual seeks medical care. At first the diagnosis is not known but after repeat visits and tests lasting several weeks, perhaps, the diagnosis is established and the patient is told the nature of his condition. Immediately, from the patient's standpoint,

that case is several weeks old. If asked in an interview about the onset of a new case in the two weeks preceding the interview, the respondent would not report the newly diagnosed case because in his mind it dates back to the onset of symptoms, well before the two-week recall period.

For these reasons information on the incidence of chronic diseases has generally been based on reports of newly diagnosed cases from the files of hospitals and physicians. However, it is only within quite recent years that the principles of probability sampling have been applied to collection of data about individual cases from medical sources. For ambulatory care the oldest series that is in any way representative of the United States is the National Disease and Therapeutic Index (NDTI), a survey of the practices of office-based physicians operated principally for the pharmaceutical industry by IMS America, LTD, a private firm whose U.S. office is located in Ambler, Pennsylvania. This was one of the principal sources relied upon by the staff of this study in producing statistics on incidence. For the purpose of determining the distribution by diagnostic category of new acute cases of eye diseases and injuries and of approximating the incidence of chronic conditions data from NDTI supplied by NIH (which subscribes to the NDTI statistical service) were used in the following way.

The survey produces national estimates of the annual number of visits to the offices of physicians[1] of all types (except those practicing solely within hospitals). It is possible to classify the visits according to the age and sex of the patient, the diagnoses of illnesses or injuries treated, and according to whether the visit was or was not a "first visit without referral." It was assumed that these first

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[1] The survey also includes home visits and visits by physicians to their private patients in hospitals and nursing homes.

visits approximated newly diagnosed cases, and percentage distributions by diagnostic category for acute conditions were calculated within each age-sex group based on averages for five calendar years: 1970-74. These percentages were then multiplied by estimated total numbers of new cases for all eye diseases combined, within each age-sex group, taken from the National Health Interview Survey. The HIS incidence data for all eye diseases combined were based on annual averages for four calendar years, 1970-73, to reduce errors of sampling. The incidence of injuries to the eye was estimated separately but using a very similar method. Further details of the methods will be presented elsewhere in this report. For chronic eye diseases the NDTI estimates of first visits were taken to represent incidence without adjustment. This use of data from a combination of sources is presented here only to indicate the shortcomings of available statistics on incidence.

Both the data sets employed have faults from the standpoint of the objectives of the present study. The household interview survey data failed to include, in any adequate way, the incidence of chronic diseases with gradual onset, as has already been pointed out. On the other hand, they are based on a better national sample and probably are the best source of incidence figures for the acute eye illnesses, such as infections, acute inflammatory diseases of the eye, and injuries (which are far more numerous in the counts of new cases than are the chronic disorders).

The data on first visits from NDTI cannot be taken to represent new cases in any precise way. There are several reasons for this (which the NDTI staff were very helpful in pointing out). First, a visit was counted as many times as there were separate diagnoses reported in the tables with

which the study was provided. (Unduplicated counts of visits can be furnished but not for a range of diagnostic categories.) This source of bias is small since there are only 1.1 to 1.2 diagnoses per visit on the average.

Second, the designation of a visit as a first visit reflects the reporting physician's knowledge of whether this patient has or has not seen another physician before for the same condition. He might not be aware that the patient had actually been seen before by another M.D. There is no way of knowing the magnitude of this effect, but it would tend to produce an overestimate of incidence.

Third, apparently first-visit reporting covers only a 12-month reporting period. That is, as we understand it, a first-visit patient could have been seen by the same physician over a year ago for the same condition. If this is the case, it could give an exaggerated impression of the number of newly diagnosed chronic diseases.

The National Center for Health Statistics has also begun to operate a survey of office-based physicians' practices, the National Ambulatory Medical Care Survey (NAMCS). Only one year of data is available at the present time, so sample sizes are inadequate for most eye diseases and no first-visit data by diagnosis have yet been produced.

Both these surveys of physicians' practices suffer from biases resulting from non-response, NDTI probably more than NAMCS. Both make adjustment for non-response by methods known to statisticians as "imputation," but the bias remains and it is of unknown magnitude and direction.

Comparison with independent sources suggests that the overall bias in the case of NDTI is in an upward direction. On the other hand, the NAMCS bias may be downward. In any case, comparison of estimated numbers of visits annually for the same disease categories shows that NDTI estimates exceed NAMCS estimates in almost every category that can be compared. (The two systems use different diagnostic coding systems.)

In summary, the available statistics on incidence that can make any claim to being nationally representative are not very satisfactory from the standpoint of NEI needs. One can therefore find internal inconsistencies in the estimates the study staff has been able to make. Yet we believe that the estimates the study has produced are as accurate as can be produced from available data sources.

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3.2 Presentation and Comments on Estimates of Incidence

In this section we shall present material which we believe should always accompany the tables themselves. We strongly urge the National Eye Institute not to detach the tables from these notes since there are limitations to their usefulness of which all users should be aware.

As has been pointed out in Section 3.1, the table to be presented here on incidence is based on a number of assumptions, some of which are open to question. These will be dealt with in Section 3.3. The defense of these assumptions is simply that they seemed to be the best possible considering the paucity of available statistics. The key figures to which the estimates for acute conditions and injuries were tied are those on national estimates of total incidence of acute eye conditions and total incidence of injury to the eye from averages of four years of data (1970-73) from the Health Interview Survey (NCHS).

It should be kept in mind that the cases included in the HIS counts are only those involving restricted activity of a day or more or medical attendance, and they were cases originating during the two calendar weeks preceding the interviewer's visit. (The great bulk of the cases have been medically attended.) There is no seasonal bias because the interviewing is spread throughout the year and response in the sample is excellent (95 percent or better).

The chronic disease incidence figures are averages of five years (1970-74) of national estimates of first visits, exclusive of referrals, to all physicians from the National

Disease and Therapeutic Index (NDTI). The assumption is made that a first visit to a physician is equivalent to a new case. The ages are, therefore, the ages of the patients at the time of the visit, not the ages at onset of the disease.

There are several independent sources that one can look at to get some indication of whether these incidence estimates are anywhere near the truth. We have already alluded to the fact that there are apparently about 332,000 cataract operations performed in the United States each year. This suggests that the incidence figure of 912,000 shown in the table, based on first visits to physicians, may be something of an overestimate.

A second comparison is with data from the Third National Cancer Survey, supplied to us through the kindness of the National Cancer Institute. That survey reported the incidence of primary invasive cancers diagnosed during the three years 1969-71. The age-adjusted annual incidence rate for cancers of the eye and orbit was 0.8 per 100,000 per year. This would correspond to about 1,600 new cases per year in the civilian non-institutional population (averaged for 1970-73). This is not consistent with the figure shown in the incidence table (7,000). The figure reported in the incidence table includes both benign and malignant neoplasms, whereas, the figure reported above covers only malignant neoplasms.

Finally, the only other source of national information on the incidence of eye injuries that could be found was the National Electronic Injury Surveillance System (NEISS) conducted by the U.S. Consumer Product Safety Commission. This survey is limited to product-related injuries treated in hospital emergency rooms. The estimate from that survey of the incidence of product-related injuries to the eye for the two calendar years 1973 and 1974 was 299,000. This, however, is not a figure that can be compared with the 1,988,000 injuries to the eye reported in HIS

because of the vastly different criteria for inclusion of a case. The figure is of interest, however, on its own merits, and there are estimates by age and sex available in the study files.

The first-visit data for eye injuries from NDTI were compared with HIS injury incidence figures age group by age group. The HIS rates were about twice as high in childhood and at the older ages but not far different at ages between 15 and 65 years. (The totals for all ages were surprisingly close -- 1,788,000 first visits for injuries from the NDTI Survey and 1,988,000 from HIS.)

Thus, we are inclined to believe that the injury data are more reliable than the disease data.

In any case, these figures should not be used for drawing epidemiological conclusions but rather for rough indicators of the relative magnitudes of new caseloads being created each year for various disease groups and at various ages.

No attempt was made to measure the incidence of refractive errors.

It should also be noted that the so-called "Special Group" contains cases that did not involve the eye since the code classifications for sarcoidosis, histoplasmosis and toxoplasmosis do not separate those involving the eye from others. The Special Group is included because of the Eye Institute's particular interest in these diseases.

Table 1. Estimates of Incidence (in Thousands of Cases Per Year) by Age and Sex - U.S. 1972[1]

Diagnosis Group and Sex		All Ages	Age (years) 0-4	5-14	15-24	25-44	45-64	65+
ACUTE CONDITIONS[2]								
Infective & parasitic diseases of eye	Both sexes	4	*	*	1	1	1	1
	Males	1	*	*	*	*	*	*
	Females	2	*	*	1	1	*	1
Allergic disorders of eye	Both sexes	200	17	68	40	39	27	8
	Males	78	10	29	19	10	8	2
	Females	121	8	39	21	29	19	7
Inflammations of eye	Both sexes	1,180	247	314	203	222	136	59
	Males	580	137	144	115	100	60	24
	Females	600	110	170	88	122	76	35
Ophthalmia neonatorum and vision symptoms[6]	Both sexes	22	4	3	2	6	4	2
	Males	12	3	1	1	3	2	1
	Females	10	1	2	1	3	2	1
All other acute diseases of eye	Both sexes	598	21	94	117	135	135	95
	Males	281	13	47	58	61	61	41
	Females	317	9	47	60	74	73	54
All acute conditions	Both sexes	2,004	289	479	363	403	303	166
	Males	954	162	221	193	175	133	69
	Females	1,050	127	258	170	228	170	97
INJURIES[3]								
Open wound of eye	Both sexes	198	64	64	19	29	17	5
	Males	173	53	57	16	27	15	4
	Females	25	11	7	3	2	2	*
Abrasion of cornea and eye	Both sexes	446	51	85	91	123	57	39
	Males	279	30	61	53	79	44	12
	Females	167	21	24	38	44	13	27
Foreign body in eye and adnexa	Both sexes	1,014	35	104	280	377	188	30
	Males	897	25	84	248	350	172	18
	Females	116	10	20	32	27	16	12
Other injury to eye and optic nerve	Both sexes	331	41	118	68	59	34	11
	Males	237	23	91	53	42	26	1
	Females	94	18	27	15	17	8	10
All injuries	Both sexes	1,988	190	371	458	589	295	84
	Males	1,584	131	293	370	499	257	35
	Females	404	59	78	88	90	38	49
CHRONIC CONDITIONS[4]								
Neoplasms of eye	Both sexes	7	*	*	2	1	3	1
	Males	4	*	*	1	1	2	1
	Females	3	*	*	1	*	2	*
Eye complications of diabetes	Both sexes	46	*	*	2	4	22	18
	Males	14	*	*	2	3	6	4
	Females	32	*	*	*	2	16	15

Table 1. Estimates of Incidence (in Thousands of Cases Per Year) by Age and Sex - U.S. 1972[1] (continued)

Diagnosis Group and Sex		All Ages	Age (years) 0-4	5-14	15-24	25-44	45-64	65+
CHRONIC CONDITIONS[4] (continued)								
Corneal ulcer and opacity	Both sexes	104	2	4	12	32	35	19
	Males	55	1	3	6	19	15	10
	Females	49	1	1	6	12	20	9
Strabismus	Both sexes	403	91	136	61	60	33	20
	Males	189	43	76	20	28	12	9
	Females	214	49	60	41	32	21	11
Cataract	Both sexes	912	1	4	10	15	190	693
	Males	333	1	3	5	9	69	246
	Females	581	*	1	6	6	121	447
Detachment of retina	Both sexes	25	*	1	1	2	9	9
	Males	13	*	*	1	*	4	7
	Females	11	*	1	1	2	5	2
Glaucoma	Both sexes	178	*	1	3	10	65	97
	Males	69	*	1	2	5	25	35
	Females	109	*	*	1	5	41	62
Congenital eye disorders	Both sexes	49	10	10	13	6	9	2
	Males	29	5	6	7	4	6	*
	Females	20	5	4	5	2	3	1
Major chronic conditions (total)	Both sexes	1,725	105	157	104	130	368	861
	Males	704	49	89	44	70	139	313
	Females	1,020	56	67	60	60	229	548
SPECIAL GROUP[5]								
Sarcoidosis, histoplasmosis and toxoplasmosis	Both sexes	13	*	2	*	7	3	*
	Males	5	*	*	*	4	1	*
	Females	7	*	2	*	3	2	*

[1] The basic source materials are statistics from the National Health Interview Survey, used to define the totals by age and sex for acute conditions and injuries, and first-visit statistics from the National Disease and Therapeutic Index, used for diagnostic distribution of acute conditions and injuries and for approximation of incidence of chronic conditions.

[2] Acute conditions include all conditions with abrupt onset and fairly short duration, plus a few minor chronic conditions in the residual group. All conditions must have involved medical care or one or more days of restricted activity. Totals agree with HIS averages for 1970-73.

[3] All injuries must have involved medical care or one or more days of restricted activity. Totals agree with HIS averages for 1970-73.

[4] Chronic condition incidence based on number of newly diagnosed cases. Age stated is age at which treatment began.

[5] This group included owing to expressed interest of NEI. Not restricted to cases involving eye because no distinction is made in the disease classification.

[6] Cases labeled ophthalmia neonatorum have been included here despite the fact that many are believed to be due to gonococcal infection. When such infection is not specified, classification practice is not to include the case with infectious diseases.

N.B. Totals may not agree with sums of subcategories owing to rounding of estimates. Asterisks indicate estimates of less than 500 cases. All estimates of less than 10,000 are subject to especially high chance of error owing both to small sample sizes and the method of estimation.

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3.3 Methodological Documentation for Estimates on Incidence

The incidence estimates were restricted to the non-institutional population. Institutional incidence is probably very small and, in any case, there are no data on it.

The general strategy adopted was to start with incidence estimates from the Health Interview Survey averaged over four years, 1970-1973. These had been supplied to us by NCHS and showed separate data by age, sex and race, and separate figures for all eye diseases and all eye injuries. Many of the cells were marked with an asterisk, meaning "figure does not meet NCHS standards of reliability or precision." The plan was to break down each age, sex, disease vs. injury group into subcategories in greater diagnostic detail using first-visits from the tables supplied by NDTI. The reasoning was that the distribution of first-visits by diagnosis ought to approximate the distribution of incidence.

A decision was quickly made that it would not be possible to show a "white vs. all other" breakdown because of small frequencies in the HIS data and the lack of any race classification in the NDTI data.

Fortunately, despite the small numbers, the HIS rates by age and sex appeared to be fairly stable. However, there were very marked differences between the HIS estimates and the NDTI first-visit estimates. (Both are in the form of U.S. estimates.)

As a result of the comparisons between the two sets of data another decision was made -- to exclude refractive errors from the incidence estimates. In the first place, the first visits for refractive errors were accounting for a large part of the differences and, in the second place, the concept of incidence is difficult to apply to refractive errors which develop in imperceptible steps, like obesity or hypertension.

The first effort to estimate incidence consisted simply of computing ratios of HIS incidence figures by age and sex for all diseases to corresponding NDTI first-visit figures for all diseases and then using these ratios as multipliers to bring the detailed NDTI estimates for disease groups into line with the HIS totals. A similar method was used for injuries.

However, some reflection about the end results of this process led to the conclusion that the results were not the best possible. The principal problem was with the incidence of chronic diseases. Here reliance on the HIS totals for all diseases was, it was decided, a mistake. The inadequacies of HIS for measuring incidence of chronic diseases were described in Section 3.1 of the report. It was believed that it would be better to assume that new cases of chronic diseases are not counted <u>at all</u> in the HIS survey and that the estimates should be keyed to HIS totals only for acute illnesses and injuries. (The injury totals were arrived at separately in the original computations and, hence, did not require change.)

The revised procedure would then be to separate acute from chronic diseases in the first-visit data from NDTI; re-compute the percentage distributions by diagnostic category within age-sex groupings for the acute conditions alone; and apply these new distributions to the HIS incidence totals for all diseases within the same age-sex groupings.

This left the problem of what data to use for the incidence of the chronic diseases. It was proposed that these be taken directly from first-visit data from NDTI without adjusting to any HIS totals. The question of whether to use first-visits to all physicians or first visits to ophthalmologists only would be decided after inspecting the data.

Other decisions made in connection with the incidence estimates would be left as before, namely:

1) The incidence estimates would be for the non-institutional population only.
2) No attempt would be made to provide a race breakdown.
3) The incidence estimates would be presented as exclusive of refractive errors.

The first step, then, was to divide the diagnostic categories we have used for incidence into acute and chronic. This was somewhat arbitrary and was done subjectively, keeping in mind the likelihood that an interview survey in which families are asked about illnesses starting in the prior fortnight would pick up cases of the particular group of diseases. If the answer seemed to be "yes," then the group was classed as acute; otherwise, it was chronic. The group numbers shown below are those used in the NDTI printouts at our request:

Acute Illness Groups

#1	Infection and parasitic diseases of eye
#4	Eye allergies
#6	Eye inflammations
#17	Ophthalmia neonatorum and vision symptoms
#13	All other diseases of the eye (includes 3830 (pterygium), 3880 (diseases of eye NOS, degeneration of macula, amblyopia, etc.), 3881-9 (atrophy of optic nerve, hematoma orbit vitreous, chalazion, retinal vitreous hemorrhage, conjunctival hemorrhage, cyst of eye).

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The last group was really questionable, but it was only practicable to count it as all acute or all chronic. The frequency of the detailed diagnoses that make it up are as follows (in terms of estimated average number of first visits to all M.D.'s).

3830	pterygium	66,000
388001	diseases of eye NOS	400,000
388010	degeneration of macula	165,000
388037	aphakia	95,000
388039	thrombosis of retinal vein	23,000
388043	amblyopia	135,000
3881	atrophy of optic nerve	18,000
3882	hematoma orbit vitreous	6,000
3883	chalazion	285,000
3884	dislocation of lens	27,000
3885	prolapse of iris	-
3886	retinal vitreous hemorrhage	49,000
3887	conjunctival hemorrhage	178,000
3888	atrophy of globe	5,000
3889	cyst, any part of eye	69,000

Although there are certainly some conditions on that list that are chronic and have a gradual onset, it is judged that the bulk of them have an acute onset and, hence, might be reported in an interview survey as having their onset at a known time.

This left the remaining groups to be considered as chronic.

#2 Special group - sarcoidosis, histoplasmosis and toxoplasmosis. (N.B. These should be excluded from the total incidence for the same reason cited in the footnote to the hospital discharges table.)

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#3 Neoplasms

#5 Eye complications of diabetes

#8 Corneal ulcer and opacity

#9 Strabismus

#10 Cataract

#11 Detachment of retina

#12 Glaucoma

#16 Congenital eye disorders

N.B. Group #7 was "refractive errors," and groups #14 and 15 "blind in one eye" and "blind in both eyes." These were omitted entirely from the incidence estimates. Groups #14 and #15 totaled only an estimated 31,000 first visits in all.

Examining the first-visit data from NDTI for these nine groups, we found the following estimates:

		First visits without referrals (Average/yr. in thousands)	
		All Physicians	Ophthalmologists
#2	Special group - sarcoidosis, histoplasmosis and toxoplasmosis	13	N.A.
#3	Neoplasms of the eye	7	5
#5	Eye complications of diabetes	46	42
#8	Corneal ulcer and opacity	104	78
#9	Strabismus	403	373
#10	Cataract	912	829
#11	Detachment of retina	25	22
#12	Glaucoma	178	146
#16	Congenital eye disorders [1/]	49	37
	Total, exclusive of #2	1724	1532

[1/] The estimates for retinitis pigmentosa alone are nine and six respectively. That is, there are about 6,000 new cases of retinitis pigmentosa diagnosed each year by ophthalmologists.

Since about 89 percent of the first visits for these groups were made to ophthalmologists, we could afford to use the data for all physicians which were available by age and sex. (The data for ophthalmologists alone were not shown by age and sex in the tables we requested from NDTI.)

If we were to show first-visit data by age and sex for these chronic disease groupings and allow them to represent incidence, we would have to adjust the data for unknown ages and unknown sex so that they would agree with the totals above. This was done.

Since the first column in the table above represents the new incidence figures shown in Table 1 for these diseases for all ages and both sexes combined, it is of interest to compare two of them with the earlier estimates and with independent data:

	Original Estimate	New Estimate	Independent Source
Neoplasms of they eye	3,000	7,000	1,600[1]
Cataract	110,000	912,000	332,000[2]

The following tables show the various stages in the estimation of incidence using the method finally decided upon.

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[1] Estimates from the Third National Cancer Survey, malignant only

[2] Estimated number of cataract operations in a year from PAS-IMS.

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Intermediate Table A - Incidence Estimates (Revised)
Percentage Distributions Within Age-Sex Groups for Five
Acute Condition Categories Based on NDTI
First-Visit Data for All M.D.'s

Acute Condition Groups	0-4 yrs		5-14 yrs		15-24 yrs		25-44 yrs		45-64 yrs		65+ yrs	
	M	F	M	F	M	F	M	F	M	F	M	F
	Estimated No. Visits (in thousands) 1970-74 Combined											
Group #1	-	-	-	-	2	8	5	11	8	8	9	19
Group #4	106	101	289	306	162	260	164	383	151	377	46	210
Group #6	1494	1469	1419	1352	982	1068	1623	1634	1079	1525	573	1122
Group #17	29	15	14	15	9	11	52	39	40	40	32	31
Group #13	137	115	463	377	493	727	993	995	1099	1472	982	1738
Totals 1/	1766	1700	2185	2050	1648	2074	2837	3062	2377	3422	1642	3120
	Percent Distributions											
Group #1	0.00	0.00	0.00	0.00	.12	.39	.18	.36	.34	.23	.55	.61
Group #4	6.00	5.94	13.23	14.93	9.83	12.54	5.78	12.51	6.35	11.02	2.80	6.73
Group #6	84.60	86.41	64.94	65.95	59.59	51.49	57.21	53.36	45.39	44.56	34.90	35.96
Group #17	1.64	.88	.64	.73	.55	.53	1.83	1.27	1.68	1.17	1.95	.99
Group #13	7.76	6.76	21.19	18.39	29.91	35.05	35.00	32.50	46.23	43.02	59.81	55.70
Totals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1/ These totals ignore visits for unknown age and sex.

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Intermediate Table B - Incidence Estimates (Revised)
Estimated Incidence by Age and Sex for Five Acute Condition Categories - 1972

	Acute Condition Groups	Number of new cases (in thousands)											
		0-4 yrs		5-14 yrs		15-24 yrs		25-44 yrs		45-64 yrs		65+ yrs	
		M	F	M	F	M	F	M	F	M	F	M	F
	All Acute Conditions [1]	162	127	221	258	193	170	175	228	133	170	69	97
#1	Infective and parasitic diseases of eye	- *	- *	- *	- *	.23 *	.66 1	.32 *	.82 1	.45 *	.39 *	.38 *	.59 1
#4	Eye allergies	9.72 10	7.54 8	29.24 29	38.52 39	18.97 19	21.32 21	10.12 10	28.52 29	8.45 8	18.73 19	1.93 2	6.53 7
#6	Eye inflammations	137.05 137	109.74 110	143.52 144	170.15 170	115.01 115	87.53 88	100.12 100	121.66 122	60.37 60	75.75 76	24.08 24	34.88 35
#17	Ophthalmia neonatorum and vision symptoms	2.66 3	1.12 1	1.41 1	1.88 2	1.06 1	.90 1	3.20 3	2.90 3	2.23 2	1.99 2	1.35 1	.96 1
#13	All other diseases of the eye	12.57 13	8.59 9	46.83 47	47.45 47	57.73 58	59.59 60	61.25 61	74.10 74	61.49 61	73.13 73	41.27 41	54.03 54

[1] From Table I, Part A of NCHS Tables. Based on average incidence for 1970-73. Figures in each column represent total at top of column distributed percentage-wise using percentages from Intermediate Table A. Columns may not add owing to rounding.

N.B. Asterisk indicates estimate less than 500. Upper numbers indicate product before rounding. These are used to obtain sex and age totals.

Intermediate Table C - Incidence Estimates (Revised)
Estimated Incidence by Age and Sex for Nine Chronic Condition Groups - Based on NDTI First-Visit Data for All M.D.'s for 1970-74 (Average per year)

Diagnostic Group and Sex		Number of New Cases (in thousands)						
		All Ages	0-4 yrs	5-14 yrs	15-24 yrs	25-44 yrs	45-14 yrs	65+ yrs
#2 Special group sarcoidosis, histoplasmosis and toxoplasmosis	Total	13	*	2	*	7	3	*
	Males	5	*	*	*	4	1	*
	Females	7	*	2	*	3	2	*
#3 Neoplasms of eye	Total	7	*	*	2	1	3	1
	Males	4	*	*	1	1	2	1
	Females	3	*	*	1	*	2	*
#5 Eye complications of diabetes	Total	46	*	*	2	4	22	18
	Males	14	*	*	2	3	6	4
	Females	32	*	*	*	2	16	15
#8 Corneal ulcer and opacity	Total	104	2	4	12	32	35	19
	Males	55	1	3	6	19	15	10
	Females	49	1	1	6	12	20	9
#9 Strabismus	Total	403	91	136	61	60	33	20
	Males	189	43	76	20	28	12	9
	Females	214	49	60	41	32	21	11
#10 Cataract	Total	912	1	4	10	15	190	693
	Males	333	1	3	5	9	69	246
	Females	581	*	1	6	6	121	447
#11 Detachment of retina	Total	25	*	1	1	2	9	9
	Males	13	*	*	1	*	4	7
	Females	11	*	1	1	2	5	2
#12 Glaucoma	Total	178	*	1	3	10	65	97
	Males	69	*	1	2	5	25	35
	Females	109	*	*	1	5	41	62
#16 Congenital eye disorders	Total	49	10	10	13	6	9	2
	Males	29	5	6	7	4	6	*
	Females	20	5	4	5	2	3	1

N.B. Data taken directly from NDTI Table B but with unknown ages and unknown sex distributed. Asterisk means estimate less than 500. Details do not add to totals because of rounding.

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4. DATA ON PREVALENCE

4.1 Evaluation of Existing Data

The statistics on prevalence, defined as the average number of persons having a particular disease or impairment living in a defined population at any one time, averaged over a specified interval of time, are probably considerably more reliable than those on incidence but not as reliable as those on volume of medical care services utilized by the national population.

The weaknesses of the prevalence statistics have one point in common with those on incidence -- inadequate sample sizes in the nationally based surveys. In the prevalence statistics, however, unlike the incidence statistics, the chronic diseases predominate. The numbers in the population at any one time afflicted with infections or inflammatory diseases or the immediate after-effects of injury tend to be trivial, but glaucoma, cataract and the eye affections resulting from congenital, metabolic, and degenerative diseases, and the late effects of trauma are by no means trivial in prevalence.

Principal reliance for prevalence statistics must be placed on population surveys. (Data on services provided in the offices of physicians, in clinics, or in hospital beds can only be used to estimate prevalence by combining the medical care data with follow-up surveys or, in the case of diseases with high mortality, by simulated follow-up using actuarial methods. It is our opinion that such methods are not generally suitable for measuring the prevalence of eye disorders.)

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The population surveys may be of the interview type or the examination-and-history type. The NCHS Health Interview Survey is an example of the former and the Health and Nutrition Examination Survey (HANES) of the latter. Each has advantages and disadvantages. Without going into detail, these can be summarized as follows:

1. The HIS is based on a much larger sample and is very well suited to securing measures of vision functioning that can be described in simple terms and arranged in the form of a scale. But it completely lacks any clinical testing of visual acuity and field of vision, and relies entirely on the lay respondent's ability to pass on diagnostic information given to the family by a physician. Furthermore, even the HIS annual sample of 134,000 persons in the households interviewed is too small to provide reliable estimates of some of the serious but low-frequency diseases of interest to NEI, such as diabetic retinopathy (which would be found about once in every 1400 persons if one combines all ages, both sexes and all degrees of disability).

2. The HANES bases its findings on carefully selected and standardized clinical tests and measurements plus a competent medical history. At least for one sample of the country the examination included a part conducted by an ophthalmologist. But the examination is restricted to a single visit, precluding any follow-up testing, and is limited by the available technology for diagnosing eye diseases during a 2-3 hour examination that includes many other parts as well. The survey has, as might be expected, very high unit costs and, consequently, the sample size for any one sampling of the U.S. population is too small to estimate prevalence for any but the commonest chronic eye diseases. Furthermore, it has a definite problem with non-response bias, particularly at the older ages.

Both of these surveys also suffer from another defect from the standpoint of measuring the national prevalence of specific diseases. They both exclude the institutional population, i.e., the population residing in long-term care establishments of

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all types, from nursing homes and homes for the aged to large chronic disease hospitals and psychiatric institutions. This institutional population is only about one percent of the total civilian population, but it is a reservoir of the most severely disabled population and definitely cannot be ignored in estimates of prevalence, particularly in the prevalence of severely disabling diseases.

Because of the paucity of information about the prevalence of disease in the institutional population, it was necessary to make a number of questionable assumptions in producing estimates for use by NEI. These assumptions are described in Section 4.3 of this report. The uncertainty about the situation in the institutional population prompts a warning that those estimates not be used separately. The statistics for the institutional and the non-institutional population were worked up separately and added together as a final step. It would be best to use only the totals.

When it comes to ascertaining the prevalence of specific eye diseases, the problem of the sample sizes in the surveys and the methods of data collection again pose obstacles. Chief reliance has been placed on the National Health Interview Survey for estimates of the overall prevalence of eye conditions sufficiently serious to cause some impairment of vision. (Definitions of disability terminology are presented in Section 4.3.) However, both sampling error considerations and knowledge of the limitations of reliability in data collected in household interviews make it necessary to look elsewhere for data to permit the distribution of this overall prevalence according

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to categories of eye disease. The sources considered most appropriate for evidence on this distribution depend on the level of disability, or impairment of vision, one wishes to consider. This leads us to a discussion of two especially important factors in the evaluation of available statistics on the prevalence of visual disorders and disabilities: measures of levels of disability, and classification by type of visual disorder. Each of these deserves separate critical examination.

4.1.1 Measures of Levels of Disability

The impairment of visual function resulting from eye disease or trauma ranges from the need to wear glasses to improve ability to perform close work, or see at a distance, or to correct a minor astigmatism, all the way to total blindness, meaning no light perception at all. A great deal of controversy has taken place over the years about how cut-off points on this scale should be defined, particularly about the cut-off point that defines something called "blindness." The reasons for the intensity of this discussion are fairly obvious. Loss of sight has been the subject of great public sympathy and concern ever since society began to worry at all about its disabled members. Legislation to provide special benefits to the blind, public programs to assist blind persons to learn to get around and to earn a decent living, and private voluntary groups collecting money and conducting research on the causes of blindness and new technology to assist the blind have grown up in all the industrialized nations. This has led to efforts to better define the groups eligible for benefits or needing assistance. But this task has proved far more complex than it might at first seem.

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This is not the place nor does this study staff have the competence to review or criticize the results of this debate. However, it does seem clear to these "outsiders" that the present situation is not satisfactory and that something better is needed in the way of objective criteria to define levels of visual impairment. This matter will be discussed further in Section 8 under the heading of recommendations for future study.

Suffice it to say here that the available statistics on the prevalence of "blindness" almost always define it in terms of "legal blindness" -- visual acuity of 20/200 or less in the better eye with best correction using ordinary lenses or a visual field limited to 20 degrees or less at its widest dimension.[1]

There are also fairly well accepted criteria, used in the blindness registers participating in the Model Reporting Area (MRA) in the United States, for more severe degrees of visual impairment. These are expressed in terms of Snellen chart readings and ability to perceive or to "project" light. ("Light projection" is the next category beyond 5/200. It denotes inability to read any letter on the Snellen chart but ability to tell which direction light is coming from. "Light perception" means ability to perceive some light but not to tell from which direction it is coming.)

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[1] The unsatisfactory character of that definition in terms of public conceptions of blindness can be illustrated by the remark of this study's ophthalmological consultant, a practicing opthalmologist, that some of his patients who meet the definition of legal blindness drive themselves to and from their appointments through city traffic.

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The statistical point in these criteria of degree of visual impairment is that accurate classification of people into these categories requires a careful examination by a competent examiner under standardized conditions -- an expensive procedure. Furthermore, estimates of prevalence at this end of the scale of impairment require very large samples, elaborate two-phase or "double" sampling techniques[2] or some kind of register operation such as the State-operated blindness registers, or registers in combination with surveys of the unregistered population. We shall not go into these methods here except to say that they have not been used in the United States. <u>There are no statistics on the prevalence of the most severe degrees of visual impairment, based on acceptable examining techniques, for representative samples of the U.S. population</u>.

The closest thing to such statistics are the data deriving from the HANES program, mentioned earlier, but the sampling errors, even for an estimate with no breakdowns by age or sex, will probably be quite high. (We have to speak in the future tense because the vision examination data from the first HANES survey are not yet available.) Furthermore, the HANES examination did not include a measurement of visual field so the effect of such inclusion on, for example, the prevalence of blindness as legally defined will have to be estimated. As mentioned earlier, the results will apply only to the non-institutional population.

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[2] There is quite a literature on economical methods of sampling for rare characteristics in the population. Two-phase sampling is only one of these methods. It consists of screening a large sample by some inexpensive method and then applying the more expensive method to finally identify those having the characteristic.

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Nevertheless, within a few months there should be data from HANES that will permit a gross comparison of the prevalence of blindness, as legally defined, measured by a survey and as estimated from the blindness register data.

In Section 2.2.2 we have commented on the present status of the blindness registers and the Model Reporting Area. In the absence of survey data, the statistics from registers are the best available on the prevalence of severe degrees of visual impairment. Because of lack of support and efforts to coordinate their activities and to make possible more complete registration, it is our opinion that it will become increasingly risky to use register data to make national estimates.

The work now being done to produce national statistics on blindness is chiefly carried out by the National Society for the Prevention of Blindness. As part of its research activities the society has used blindness register data from those registers considered to be most complete to make State-by-State estimates of prevalence and incidence of blindness, using regression techniques. The society has also conducted studies of its own to produce statistics on special aspects of the problem, such as childhood blindness.[1] The estimates of blindness prevalence contained in this report have been adjusted to agree with the overall total for the United States and the rates by age and sex produced by the National Society since we believe they are the most carefully derived figures now available.

When we turn our attention to measures of the prevalence of visual disorder causing lesser degrees of impairment of vision, the Health Examination Survey (HES) conducted by NCHS

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[1] See Hatfield, 1972, for example.

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(which is the predecessor of the HANES program) has produced a wealth of data. At various times HES has examined samples of the non-institutional population 18-79 years of age, 6-11 years of age, and 12-17 years of age. Each of these surveys included tests of vision, but there was not an examination by an ophthalmologist. In the case of the young children, for example, the examination was done by a pediatrician and there were tests of phoria, visual acuity, and color blindness. The pediatrician looked for evidence of styes, conjunctivitis, blepharitis, nystagmus, ptosis, and strabismus. It would require an entire report in itself to describe in any detail the methods employed in gathering these statistics, but they are thoroughly covered in Series 11 of the Vital and Health Statistics series as well as in program descriptions in Series 1 and validation studies in Series 2.

In general, the principal limitations are those already mentioned in connection with HANES, namely, inadequate sample sizes owing to the high unit costs, the limits imposed by a single-visit examination conducted in trailer-type mobile clinics, and bias due to non-response at the older ages and principally in the more highly urbanized population. Nevertheless, few would disagree that these are the best data of this type for national populations available in the world today.

The prevalence figures from HES for disease categories tend to be much higher than those presented in the estimates for this study. This is because in the former there is no lower limit set in terms of vision impairment. For example, to quote from "Eye Examination Findings Among Children: United States," Series 11, No. 115, Vital and Health Statistics:

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> "Nearly one-tenth (91.8 per 1,000 children), or 2.2 million of the 24 million children aged 6-11 years in the non-institutionalized population of the United States, were found to have an eye muscle imbalance, a disease condition, or other abnormality in one or both eyes. . . . Strabismus was the condition found most frequently. Nearly one child in 14 (67.2 per 1,000 children), or an estimated 1.6 million, had sufficient eye muscle imbalance to be rated as having strabismus."

By contrast, the figure shown in the estimates prepared for this report for disability category A, "total prevalence of impaired vision," is 5,827,000 for all persons under 65 years of age and of these 2,444,000 were classified as "other." This is the group containing strabismus.

A problem with the HES data for a study such as this one is that the three age groups were all surveyed at different times, and there were different emphases in the three examination protocols. It is, therefore, not possible to put together from the available data prevalence figures for a list of eye diseases such as has been used for this report. Nevertheless, there is a great deal of information available on the prevalence of eye diseases and visual acuity levels in the Series 11 reports published by NCHS. This has not been used in the estimates for this report, but the pertinent reports have been listed in Appendix E, the bibliography.

The Health Interview Survey, on the other hand, concentrated on measuring prevalence at specified levels of disability. It de-emphasizes diagnostic or etiologic detail and, of course, includes no clinical testing. Over the years the staff of HIS has done a good deal of experimenting with the development of scales for classifying persons with impairment

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of vision. The purpose of the scales is to group people having some trouble with visual functioning into categories of increasing disability using the respondent's answers to a series of simple questions. The most commonly used category is labeled "severe visual impairment" and is defined as:

> A negative response with regard to both eyes to the question: "Can -- see well enough to read ordinary newspaper print (with glasses) with his (her) (left, right) eye?," or a report that the person had no useful vision in either eye, or a statement that he was "blind" in both eyes. For children under 6 years of age the question on reading is not asked but the child is classified as severely impaired if described as blind in both eyes or with no useful vision in either eye.

In 1971 there were an estimated 1,306,000[1] persons in the non-institutional population who met that definition. Regarding the 1,300,000[1] who were six years of age or older, the following further information was reported:

- Able to recognize the features of a friend if close enough ---------- 79 percent
- Able to see moving objects, such as cars moving or people walking ---------- 87 percent
- Able to see well enough to step down - 71 percent
- Able to recognize a friend walking on the other side of the street ---------- 33 percent

It is our opinion that the usefulness of scales constructed from questions such as these and their relationship to the data from clinical testing have not yet been demonstrated. However, the need for statistics that reliably classify people

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[1] These data are from Vital and Health Statistics Series 10, No. 99, Table B and Table 2.

into groups according to their ability to perform everyday tasks is unquestionable. Hence, research should continue. We shall come back to this in Section 8.

4.1.2 Classification of Prevalence Data by Types of Visual Disorder

The dissatisfaction expressed by the National Eye Institute in asking for proposals for a critique of available data on visual disorders is easily understandable. A good part of the problem, we believe, results from lack of uniformity in the classifications used. We have referred in the previous section to the lack of an agreed-upon and feasible set of disability criteria for use when clinical testing is not possible. There is also need for greater conformity in the classification of visual disorders. The study staff dealt with four different classifications and found considerable difficulty in putting data from different sources together.

The National Center for Health Statistics uses the 8th revision of the International Classification of Diseases Adapted (for Use in the United States) or ICDA-8th revision. This code was used for classifying conditions treated in hospitals (in the Hospital Discharge Survey) and in doctors' offices (in the National Ambulatory Medical Care Survey). Hospital data from the nation's largest abstracting system, the Professional Activity Study, are coded using a variant of ICDA-8th revision, known as H-ICDA. Fortunately, these two do not differ greatly. On the other hand, the National Disease and Therapeutic Index (NDTI) codes the conditions treated in doctors' offices using the 7th revision of the International List which contains a number of differences from the 8th revision in the

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section dealing with eye diseases. Finally, the eye problems responsible for the blindness of people on the State blindness registers in the Model Reporting Area were classified by the Standard Classification of Causes of Severe Vision Impairment and Blindness, 1966 Revision. This latter code was developed by the National Society for the Prevention of Blindness. It has two sections, one dealing with the site and type of "affection," meaning the problem with the eye, and the other with the etiology of the eye problem.

Most of the prevalence tables from the MRA are based principally on type of affection, but the prevalence data from the HIS tend to emphasize the etiology. For example, the MRA tables show nothing about the prevalence of blindness resulting from injury to the eye, while the HIS data provide a separate category for such cases.

For the purposes for which it is intended the NSPB classification seems most useful and flexible, but it is unsuitable for data on the incidence of eye diseases. For incidence statistics and statistics on medical care in hospitals or doctors' offices the ICDA or H-ICDA are superior. The code used by NDTI is out of date and cannot easily be made to correspond with data from other sources. Fortunately, several additional digits of detail have been added to the original 4-digit code, so it is by far the most detailed classification available.

Another difference of some importance in the way data from these major systems are classified by type of disorder lies in the opportunities for quality control in the coding process. In the NCHS and NDTI surveys, coding is done centrally by trained nosologists. In the PAS system the abstracts are coded in the hospitals, but a sample quality control operation is performed centrally. The blindness register data are now coded separately by each state, but, until the federal support

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of the MRA terminated, the records were, in the early years of MRA, occasionally reviewed by the National Society for the Prevention of Blindness and in later years coded at the National Eye Institute, thus adding to the standards of quality control.

It proved impossible to use the same disease classification for all tables prepared for this report. The basis of the classification will be described in the notes on the tables.

It is not feasible to use identical classifications for prevalence and incidence because of the vast differences in relative frequencies, but the classifications should at least be compatible. They now are not.

4.2 Presentation and Comments on Estimates of Prevalence

The general characteristics of the prevalence statistics to be presented here have been discussed in Section 4.1. Again, a number of assumptions had to be made which will be detailed in Section 4.3. As noted previously, these notes should not be detached from the tables since all users should be made aware of the limitations of the data.

The weakest part of the estimates has to do with prevalence in the institutional population. The numbers of cases in institutions are too large to be ignored (in contrast with incidence for which institutional cases can and have been ignored). Yet the data on the institutional prevalence are very incomplete. Data were available from a survey of nursing homes, and these were used to estimate prevalence in that part of the total institutional population that were in nursing homes and other institutions believed to be similar to the nursing homes in the characteristics of their patients. The remainder of the institutional population was assumed to have the same prevalence rates as the non-institutional population.

The estimates for the non-institutional population have been tied to the figures from the Health Interview Survey in the case of Tables 2 and 3. These statistics are probably considerably more reliable than those on incidence, but the assumptions made in subdividing the total into "eye affection" categories should be understood by anyone using these tables.

The "eye affection" classification is based on one used for MRA statistics but with the addition of a category for minor impairment due to errors of refraction. The addition of this category was necessitated by the desire to use the same "affection" classification for all three levels of disability. In this category

are persons whose vision is impaired by one or another type of refractive error but not impaired to the extent that it meets the definition of "severe visual impairment" in Table 3. This classification emphasizes the nature of the current problem with the eye and de-emphasizes the etiology of the disorder.

The estimates in Table 4 are probably underestimates of the amount of blindness in the country meeting the legal blindness definition. This is because even the best of the State registers of blindness (on which the National Society for the Prevention of Blindness basically relies) probably miss certain cases in the population. For example, we are told that the registers are intended to include cases residing in institutions but could very well miss some. Furthermore, cases not requiring or not requesting any assistance from the public and private programs of assistance would be less likely to be registered.

It should again be emphasized that the statistics in Tables 2, 3, and 4 should not be used to draw epidemiologic conclusions. They can be used as measures of the gross magnitude of the disease problems in the population, the extent of disability, and the rough divisions into categories of eye disorders. The available data did not permit the making of estimates for detailed ages under 65 years or for showing the prevalence in the non-white population by age and sex. This is principally because of small sample sizes in the HIS sample.

Note that the estimates in Table 2 include all the cases in Table 3, and those in Table 3 for all practical purposes include all those in Table 4, i.e. each category of disability conceptually includes the one following it as a subcategory. Definitions of the disability categories will be found in the methodological documentation following the tables.

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Table 2. Estimates of Prevalence for Disability Category A (Impaired Vision) by Age and Sex, and for the White and All Other Populations - U.S. 1972[1]

Type of Eye Affection	Estimated # of Persons with Impaired Vision (in Thousands) - U.S. 1972[1]										
				0-64 Years			65+ Years				
	Total	Males	Females	Total	Males	Females	Total	Males	Females	White	All Other
All Affections	10,659	5,315	5,344	5,827	3,582	2,245	4,832	1,733	3,099	9,476	1,183
Glaucoma	1,070	453	617	261	158	104	808	295	513	902	168
Cataract-prenatal	41	21	19	34	18	16	7	3	4	29	11
Cataract-other	1,670	681	989	356	220	136	1,314	460	853	1,555	115
Retinal Disorder-prenatal	76	37	39	48	26	22	29	12	17	67	10
Retinal Disorder-diabetic	138	48	90	53	28	25	85	21	64	123	15
Retinal Disorder-other	601	255	344	197	116	81	404	139	264	568	31
Retrolental Fibroplasia	19	8	11	19	8	11	*	*	*	17	2
Myopia	715	375	340	566	321	245	148	53	95	642	73
Cornea or Sclera	294	179	115	195	133	62	99	46	53	247	47
Uveitis	285	148	137	185	111	73	100	36	64	243	43
Optic nerve Disease	121	62	59	56	30	26	65	32	32	89	32
Multiple Affections	90	24	66	9	3	6	81	21	60	80	11
Refractive Errors with lesser Disability[2]	1,662	880	782	1,347	767	581	314	113	201	1,563	99
Other	3,656	2,057	1,599	2,444	1,614	831	1,212	444	767	3,152	504
Unknown	221	86	135	55	30	25	166	56	110	198	23

N.B. The columns do not always add owing to rounding. Estimates are for the total civilian population. Asterisk indicates estimate could not be practically made owing to the low frequency in the cell. All estimates less than 25,000 are subject to large relative errors of sampling. The "All Other" estimates were made separately, and the estimate for "White" population obtained by subtraction.

[1]Based upon prevalence figures by age and sex from the Health Interview Survey and the 1973-74 Nursing Home Survey subdivided into more detailed eye affection categories using all-visit statistics from the National Disease and Therapeutic Index (for the lesser impairments) and Model Reporting Area data (for the more seriously impaired).

[2]For definition of this affection group, see Section 4.3.

Table 3. Estimates of Prevalence for Disability Category B (Severe Visual Impairment) by Age and Sex, and for the White and All Other Populations - U.S. 1972[1]

Type of Eye Affection	Estimated Number of Persons with Severe Visual Impairment (in Thousands) - U.S. 1972[1]										
				0-64 Years			65+ Years				
	Total	Males	Females	Total	Males	Females	Total	Males	Females	White	All Other
All Affections	1,483	557	926	423	203	220	1,060	354	706	1,227	256
Glaucoma	207	79	128	28	13	15	179	66	113	153	54
Cataract-prenatal	34	16	17	27	13	14	7	3	4	23	10
Cataract-other	183	56	127	21	9	12	162	46	115	160	22
Retinal Disorder-prenatal	72	34	38	44	23	21	29	12	17	63	9
Retinal Disorder-diabetic	70	18	52	21	8	13	49	10	39	60	10
Retinal Disorder-other	250	82	167	33	16	17	217	66	150	231	18
Retrolental Fibroplasia	19	8	11	19	8	11	*	*	*	17	2
Myopia	36	15	21	16	8	8	20	7	13	29	7
Cornea or Sclera	67	25	42	21	9	12	46	16	30	50	17
Uveitis	67	27	40	26	11	14	41	15	26	51	16
Optic nerve Disease	107	55	52	49	26	23	58	29	28	77	30
Multiple Affections	90	24	66	9	3	6	81	21	60	80	11
Refractive Errors with lesser Disability	0	0	0	0	0	0	0	0	0	0	0
Other	103	51	52	68	36	33	35	16	19	74	29
Unknown	179	66	113	41	20	21	138	46	92	159	20

N.B. The columns do not always add owing to rounding. Estimates are for the total civilian population. Asterisk indicates estimates could not be practically made owing to the low frequency in the cell. All estimates less than 25,000 are subject to large relative errors of sampling. The "All Other" estimates were made separately, and the estimate for "White" population obtained by subtraction. Note that the cases in Disability Category B are included in Category A, a broader group.

[1]Based upon prevalence figures by age and sex from the Health Interview Survey and the 1973-74 Nursing Home Survey subdivided into more detailed eye affection categories using statistics from the Model Reporting Area.

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Table 4. Estimates of Prevalence for Disability Category C (Legal Blindness) by Age and Sex, and for the White and All Other Populations - U.S. 1972[1]

Type of Eye Affection	Estimated Number of Legally Blind Persons (in Thousands) - U.S. 1972										
				0-64 Years			65+ Years				
	Total	Males	Females	Total	Males	Females	Total	Males	Females	White	All Other
All Affections	468	224	244	229	126	103	239	98	141	361	107
Glaucoma	56	26	30	15	8	7	41	18	23	33	23
Cataract-prenatal	16	9	7	14	8	6	2	1	1	12	4
Cataract-other	48	19	29	12	6	6	36	13	23	39	9
Retinal Disorder - prenatal	30	17	13	24	14	10	6	3	3	26	4
Retinal Disorder - diabetic	22	8	14	11	5	6	11	3	8	18	4
Retinal Disorder - other	66	28	38	18	10	8	48	18	30	58	8
Retrolental Fibroplasia	10	5	5	10	5	5	*	*	*	9	1
Myopia	14	7	7	9	5	4	5	2	3	11	3
Cornea or Sclera	22	10	12	12	6	6	10	4	6	15	7
Uveitis	23	11	12	14	7	7	9	4	5	16	7
Optic nerve Disease	41	24	17	27	16	11	14	8	6	29	12
Multiple Affections	23	8	15	5	2	3	18	6	12	19	4
Refractive Errors with lesser Disability	0	0	0	0	0	0	0	0	0	0	0
Other	45	26	19	37	22	15	8	4	4	33	12
Unknown	53	25	28	22	12	10	31	13	18	45	8

[1]Based upon prevalence figures published by the National Association for the Prevention of Blindness (see Hatfield: Sight-Saving Review, Vol. 43, No. 2) subdivided by age and sex and type of eye affection categories using statistics from the Model Reporting Area.

N.B. Columns may not always add owing to rounding. Asterisk means estimate is less than 500. Estimates are for the total civilian population. All estimates less than 25,000 are subject to large relative errors of sampling. The "All Other" estimates were made separately, and the estimate for "White" population obtained by subtraction. Note that the cases in Disability Category C are almost entirely included in Category B, a broader group.

4.3 Methodological Documentation for Estimates of Prevalence

The general concept of the desired prevalence tables was first to produce estimates by age, sex and race of the prevalence of impaired vision according to various levels of disability, or impairment and then to break down these totals into disease categories. It was recognized that the institutional population could not be ignored and would have to be estimated separately because the major NCHS population surveys are aimed at the non-institutional population only.

At first it was hoped that four levels of impairment, or disability, could be used:

A. Impaired vision, as defined in HIS.
B. Severe visual impairment, as defined in HIS.
C. Inability to recognize features of a friend even if they are close by.
D. Legal blindness.

The original C category was dropped out, however, for three reasons: first, because there was very little data on prevalence according to this criterion; second, because what data there were suggested it is a much more unusual characteristic than legal blindness (perhaps no more than 0.8 per 100,000 in the non-institutional population); and, third, because it is a more subjective and untested criterion and not of proven use-fulness.

Thus, the original A, B, C, D categories became:

A. Impaired vision, as defined in HIS. This is as follows: Any response in the interview indicating blindness in one or both eyes, cataract, glaucoma,

color blindness, detached retina or other condition of the retina, or "any other trouble seeing with one or both eyes even when wearing glasses."

B. Severe visual impairment, as defined in HIS. This is as follows: those with impaired vision for whom there was also a response in the interview indicating inability to read ordinary newspaper print with glasses using both eyes (six years of age or older); or indicating the person had no useful vision in either eye or was "blind" in both eyes (any age).

C. Legal blindness. That is: visual acuity for distant vision of 20/200 or less in the better eye, with best correction; or widest diameter of visual field subtending an angle less than 20^{o}.

For categories A and B it was decided to rely on data from HIS rather than HANES for several reasons:

a) The HANES sample sizes are too small.

b) The HANES or HES surveys of different age groups were done at different times and actually never covered the whole age range.

c) The HES measured strictly visual acuity in some of the age ranges, so it is not possible to put together consistent measures of visual impairment for the three age ranges covered.

For category C it was decided to key the results to the estimates made by Elizabeth Hatfield of the National Association for the Prevention of Blindness since these were based on the best State registers (in terms of completeness) and made allowance for state-to-state differences that might be expected.

Upon examination of the data, it was decided that the demographic categories would have to be sharply limited because of sample size problems. Only two age groups, 0-64 years

and 65 and over, could be shown by sex and any figures for the non-white population would have to be entirely separate and not cross-tabulated by other characteristics. Thus, in effect, only five cells were estimated:

0-64 Males
0-64 Females
65+ Males
65+ Females
Total non-white

The other cells shown were obtained by addition or subtraction from those five.

The general strategy for Disability Categories A and B was: 1) to obtain the best possible estimates of the prevalence rates in each of the five demographic cells for the institutional and non-institutional populations separately; 2) to obtain estimates of numbers of cases in the prevalence counts by multiplying the rates by the appropriate 1972 population totals; 3) to add the numbers for the institutional and non-institutional populations together to obtain totals for the civilian population; 4) to subtract Category B numbers from Category A numbers in order to obtain a set of new numbers which represented persons with impaired vision but <u>not</u> severely impaired.

The basic rates for Step 1) were obtained from Tables 1 and 2 of Series 10, No. 99, of the Vital and Health Statistics Series (for the non-institutional population) and from special tables from the 1973-74 Nursing Home Survey supplied to us by NCHS. It was possible, using data from the Nursing Home Survey, to compute rates that corresponded fairly well in their definitions to categories A and B from the HIS. The rates for the nursing home population, however, were very much higher than those for the non-institutional population, as might be expected.

000762

The problem was to determine what part of the institutional population could be said to be experiencing these rates, and then to secure estimates of the 1972 population of that part of the total institutional population.

For the remainder of the institutional population there were no data found that could be considered representative. However, this remainder was made up for the most part of the institutions for the mentally ill or retarded, for dependent children, for the unwed mothers, for juvenile delinquents, and prisons. Hence, it was considered reasonable to assume that prevalence rates in these places were the same, age for age, as those in the non-institutional population.

The small population of homes for the blind was treated separately.

The method for prevalence in the institutional population therefore consisted of the following steps:

1. From 1970 Census data population figures were abstracted by age and sex and for the total other-than-white population, classified by type of institution.
2. The institution types were then groups into three categories:
   a) Homes and residential schools for the blind.
   b) Homes and schools for other physically handicapped, homes for the aged and dependent, and chronic disease hospitals other than tuberculosis and mental disease hospitals.

c) Mental and tuberculosis hospitals, homes and schools for the mentally handicapped, homes for dependent and neglected children, homes for unwed mothers, training schools for juvenile delinquents, detention homes, diagnostic and reception centers, and correctional institutions.

3. The population figures in 6 age-sex classes, and a total non-white group for institution types a), b) and c) were next updated to 1972 using the assumption that the small increase was proportionally distributed in the demographic groups and institution-type categories.

4. Group a) was assumed to have 100 percent prevalence in Disability Categories A and B. Group b) was assumed to have the same rates for each age-sex group, and for non-whites, as had been found in the Nursing Home Survey. Group c) was assumed to have the same rates as the non-institutional population.

5. Using these assumptions, the prevalence rates were multiplied by the population figures to obtain estimates of the numbers of persons with impaired vision, Disability Category A, and severely impaired vision, Disability Category B.

6. The total figures for the entire institutional population were then added to the corresponding figures for the non-institutional population to obtain estimates for the total civilian population.

As will be seen from the accompanying tables, certain additional assumptions had to be made about population distribution at ages 25 years and over for certain types of institutions. This is because the published Census figures did not show the breakdown into the groups 25-64 years and 65 years and over.

Not all of the intermediate tables in this computation are shown here because of their volume. Tables not published are available in the study files.

The prevalence rates used are shown in the first intermediate table. In the second table are the 1972 estimates of the institutional population used, broken into groups a), b) and c). In the third table are the estimated numbers of visually impaired persons in the institutional population for 1972.

Intermediate Table D

Prevalence Rates Used For Disability Categories A and B

Disability Category		Males			Females			Total non-white
		0-24	25-64	65+	0-24	25-64	65+	
Non-institutional population	Cat. A	.01520	.06400	.18300	.00610	.04000	.22040	.04461
	Cat. B	.00080	.00350	.03830	.00090	.00350	.05330	.00960
Institutional population	Cat. A	.33940	.56000	.78287	.47160	.61000	.86836	.55028
	Cat. B	.05230	.09200	.12906	.04100	.09500	.13695	.11732

000036

Intermediate Table E

Estimate of Inmate Population by Type of Institution by Age and Sex for Total Civilian Population and for All Ages and Sexes for All Other Population: U.S. 1972

Type of Institution	Males			Females			All Other
	0-24	25-65	65+	0-24	25-64	65+	All ages, both sexes
a) Homes and Schools for the Blind	3,353.71	536.39	0	2,691.23	600.46	0	1,527.79
b) Institutions for which Nursing Home Rates are used	16,031.66	87,481.64	258,935.16	11,252.75	70,669.70	599,902.30	62,586.11
c) Institutions for which Non-Institution Rates are used	317,632.79	416,139.80	63,947.81	111,705.83	163,543.10	73,539.71	292,893.67

000067

Intermediate Table F

Estimated Number of Visually Impaired Persons by Disability Category for the Institutional Population: U.S. 1972

Category A	Males			Females			All Others
	0-24	25-64	65+	0-24	25-64	65+	all ages both sexes
Homes and Schools for the Blind	3,354	536	0	2,691	601	0	1,528
Institutions for which Nursing Home Rates are used	5,441	48,990	202,713	5,307	43,109	520,931	34,440
Institutions for which Non-Institution Rates are used	4,828	26,633	11,702	681	6,542	16,208	13,066
Totals 900,267	13,623	76,159	214,415	8,679	50,252	537,139	49,034

Category B	0-24	25-64	65+	0-24	25-64	65+	all ages both sexes
Homes and Schools for the Blind	3,354	536	0	2,691	601	0	1,528
Institutions for which Nursing Home Rates are used	839	8,048	33,418	461	6,714	82,157	7,343
Institutions for which Non-Institution Rates are used	254	1,457	2,449	101	572	3,920	2,812
Totals 147,572	4,447	10,041	35,867	3,253	7,887	86,077	11,683

4-27

The next decisions had to do with the appropriate data for distributing the disability categories by type of eye problem.

For Category B it was decided to use the classification of eye affections that appears in Table 30 of "Statistics on Blindness in the MRA, 1969-1970," published by the National Eye Institute. The distribution of cases by Eye Affection category could then be taken from the appropriate age and sex categories of the tables in that report. Since these were also used to distribute the "legally blind," Category C, there is another assumption implied -- that within the demographic categories those with "severe visual impairment" are distributed by type of eye affection in the same way that the "legally blind" are distributed. Despite the much larger numbers of the "severe visual impairment" group, this assumption seems to us to be a reasonable one.

However, the next decision was a more difficult one: what data should be used to distribute the least severely impaired (Category A minus Category B)? After much deliberation, it was decided to use all-visit data from NDTI. The assumption was made that persons with impaired, but not severely impaired, vision would be distributed by type of eye affection in the same way that total visits to physicians are distributed. This decision was made essentially because no more appropriate source could be found.

This decision made necessary two additional operations: first, the regrouping of the NDTI diagnostic categories to correspond with those used for the other two disability categories, B and C. It was found that this could only be done in a rough way and then only by the addition of a new eye affection group which we called "Refractive errors involving lesser disability." This group comes into Category A minus Category B but is assumed to be zero in Categories B and C.

000069

Second, it was necessary to use some special measures to reflect the differences in eye affection distribution between the "White" and "All Other" population in Category A minus Category B, that is, the persons with lesser disability. This was because the NDTI all-visit statistics are not available for whites and others separately. This was handled by computing ratios of "All Other" prevalence rates to total prevalence rates for each eye affection category in the Category B data and multiplying these ratios by the prevalence rates for the total population in the lesser disability category to obtain an estimated "All Other" prevalence rate for each eye affection category in the lesser disability group. The percentage distribution of these rates by type of eye affection was then applied to the total number of persons other than white in Category A minus Category B. The totals for the white population were then obtained by subtraction.

As a final step the data for Category A minus Category B were added cell for cell to the data for Category B to obtain totals for Category A.

The computations for Category C also involved some assumptions. As has been mentioned, the rates for legal blindness were to be tied to data in a paper appearing in Sight Saving Review, Vol. 43, No. 2., by Elizabeth Hatfield: "Estimates of Blindness...". Table 1 in that paper had a national estimated number of blind and also a prevalence rate. The rate was 224.7 per 100,000 population (for the 50 U.S. states and the District of Columbia), but it was not shown by age, race, or sex. However, in Table 2 there were rates by age, by sex, and for whites and non-whites for the three states that formed the basis of her estimation. Totals for the needed demographic categories were obtained by the computations shown in the final table in this Section.

It should be noted that the blindness registers are supposed to cover both the institutional and the non-institutional population, so it was not necessary in Category C to make two separate estimates and add them together. However, as set forth elsewhere, the coverage of the registers is probably incomplete and particularly so in the institutional population, so the estimates are probably on the low side.

The total prevalence rate for legal blindness that can be computed from this report using the population table provided is slightly higher than Hatfield's rate (227 vs. 224.7 per 100,000). This is because the denominators used here contain only the civilian population, instead of the total population as Hatfield used. We feel this is slightly more appropriate.

The totals for Category C in the various demographic groups were distributed by type of eye affection using the same percentage distributions as were used for Category B, i.e., Table 30 of "Statistics of Blindness in the MRA, 1969-1970."

000071

Intermediate Table G

Estimated Numbers of Disabled Persons (in Thousands) in the Institutional, Non-Institutional and Total Civilian Population for Disability Categories A, B, and A-B: U.S. 1972

Disability Category	Total	Males	Females	0-64 Years			65+ Years			White	All Other
				Total	Males	Females	Total	Males	Females		
Institutional Population											
A.	900	304	596	149	90	59	751	214	537	851	49
B.	147	50	97	25	14	11	122	36	86	136	12
Non-institutional Population											
A.	9,759	5,011	4,748	5,678	3,492	2,186	4,081	1,519	2,562	8,625	1,134
B.	1,336	507	829	398	189	209	938	318	620	1,092	244
Total Civilian Population											
A.	10,659	5,315	5,344	5,827	3,582	2,245	4,832	1,733	3,099	9,476	1,183
B.	1,483	557	926	423	203	220	1,060	354	706	1,227	256
A - B	9,176	4,758	4,418	5,404	3,379	2,025	3,772	1,379	2,393	8,249	927

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Intermediate Table H

Percentage Distribution by Diagnosis for Age, Sex and Color from 14 MRA State
December 31, 1970
)urce: Table 30, "Statistics on Blindness in the MRA, 1969-70" Kahn and Moorhea

nosis	0-64 Male		0-64 Female		65+ Male		65+ Female		White		All Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
ctions	17,305	100.00	14,145	100.00	9,595	100.00	13,838	100.00	39,544	100.00	15,339	100.00
coma	1,111	6.42	934	6.60	1,798	18.74	2,216	16.01	2,832	7.16	3,227	21.04
ract-natal	1,103	6.37	884	6.25	93	.97	70	.51	1,544	3.90	606	3.96
ract-er	779	4.50	756	5.34	1,260	13.13	2,257	16.31	3,709	9.38	1,343	8.76
nal rder - natal	1,930	11.15	1,356	9.59	319	3.32	332	2.40	3,366	8.51	571	3.72
nal rder - betic	667	3.85	871	6.16	280	2.92	757	5.47	1,951	4.93	624	4.07
nal rder - ier	1,384	8.00	1,077	7.61	1,795	18.71	2,949	21.31	6,100	15.43	1,105	7.20
olental oplasia	696	4.02	679	4.80	-	-	1	.01	1,269	3.21	107	.70
ia	664	3.84	529	3.74	185	1.93	249	1.80	1,216	3.08	411	2.68
ea or ra	784	4.53	792	5.60	420	4.38	588	4.25	1,578	4.00	1,006	6.56
tis	976	5.64	923	6.53	418	4.36	505	3.65	1,853	4.69	969	6.32
c nerve ase	2,119	12.71	1,488	10.52	798	8.32	557	4.03	3,257	8.24	1,785	11.64
iple ctions	278	1.61	386	2.73	556	5.79	1,185	8.56	1,775	4.49	630	4.11
r	3,039	17.56	2,109	14.91	426	4.44	372	2.69	4,205	10.63	1,741	11.35
own	1,695	9.79	1,361	9.62	1,247	13.00	1,800	13.01	4,889	12.36	1,214	7.91

se percentages will be used for Disability Categories B and C. All totals for ages and
s will be obtained by addition. The "White" will be obtained by subtraction after
)uting the "All Other" from the appropriate percent list.

Intermediate Table I

Diagnostic Breakdown for Least Disabling Conditions

Grouping of NDTI Categories to
Correspond With Those in MRA Categories

MRA Affection Category	Corresponding NDTI Categories
Glaucoma	In 0-64 group, use Group 12 and 17 Percent of Group 16 In 65+ use Group 12 and three percent of Group 23
Cataract - prenatal	In 0-64 group use 24 percent of Group 16 for each sex. In 65 + use 0 percent.
Cataract - other	Use Group 10 plus 62 percent of Group 23
Retinal disease - prenatal	In 0-64 group, use 15 percent of Group 16. In 65 + use 0 percent.
Retinal disease - diabetic	Use Group 5
Retinal disease - other	Use Group 11 and 20 percent of Group 13 and four percent of Group 23
Retrolental fibroplasia	Use 0 percent
Myopia	Use 29 percent of Group 7
Cornea or sclera	Use Group 8 and 22 percent of Group 18 and 90 percent of Group 19
Uveitis	Use 18 percent of Group 6
Optic Nerve disease	Use one percent of Group 13
Multiple affections	Use 0 percent
Other	Use balance of other categories
Unknown	Use Groups 14 and 15
Refractive errors of Lesser disability	Use 71 percent of Group 7

Intermediate Table J
NDTI Table B - Diagnostic Distributions for Total Physician Visits by Age and Sex - Total

Diagnostic Group	All Ages		<65		65+		Age Unspecified	
	No.	%	No.	%	No.	%	No.	%
Grand Total	319,182	100.00	224,638	100.00	89,678	100.00	4,866	100.00
Infective & parasitic diseases of the eye	553	.17	301	.13	244	.27	8	.16
Special group	1,452	.45	1,296	.58	109	.12	47	.97
Neoplasms of eye	335	.11	228	.10	95	.11	12	.25
Eye allergies	6,930	2.17	5,705	2.54	1,072	1.20	153	3.14
Eye complications of diabetes	2,215	.69	1,323	.59	854	.95	38	.78
Eye inflammations	45,525	14.26	36,821	16.39	7,831	8.73	873	17.94
Refractive errors	93,222	29.21	81,800	36.41	10,563	11.78	859	17.65
Corneal ulcer and opacity	2,715	.85	1,976	.88	694	.77	45	.92
Strabismus	10,718	3.36	10,153	4.52	472	.53	93	1.91
Cataract	25,616	8.03	6.165	2.74	19,038	21.23	413	8.49
Detachment of retina	1,029	.32	580	.26	435	.49	14	.29
Glaucoma	24,681	7.73	9,510	4.23	14,624	16.31	547	11.24
All other diseases of the eye	46,902	14.69	28,951	12.89	17,282	19.27	669	13.75
Blind, both eyes	978	.31	374	.17	575	.64	29	.60
Blind, one eye	245	.08	147	.07	98	.11	-	-
Congenital eye disorders	1,244	.39	1,175	.52	50	.06	19	.39
Ophthalmia neonatorum and vision symptoms	1,382	.43	1,089	.48	270	.30	23	.47
Open wound of eye	2,382	.75	2,216	.99	105	.12	61	1.25
Abrasion of cornea and eye	5,257	1.65	4,829	2.15	293	.33	135	2.77
Foreign body in eye and adnexa	9,517	2.98	9,087	4.05	268	.30	162	3.33
Other injury to eye and optic nerve	3,120	.98	2,936	1.31	114	.13	70	1.44
Routine eye exam	4,757	1.49	4,110	1.83	584	.65	63	1.29
Surgical aftercare, eye operations	26,342	8.25	12,436	5.54	13,405	14.95	501	10.30
Medical aftercare eye diseases	1,332	.42	950	.42	365	.41	17	.35
Other eye care	734	.23	478	.21	240	.27	16	.33
	319,183	100.00	224,636	100.00	89,680	100.03	4,867	100.01

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Intermediate Table K

NDTI Table B - Diagnostic Distributions for Total Physician Visits by Age and Sex - Males

Diagnostic Group	All Ages		< 65		65 +		Age Unspecified	
	No.	%	No.	%	No.	%	No.	%
Grand Total	135,492	100.00	103,098	100.00	31,454	100.00	940	100.00
Infective & parasitic diseases of the eye	256	.19	152	.15	103	.33	-	-
Special group	599	.44	521	.51	42	.13	36	3.83
Neoplasms of eye	110	.08	75	.07	35	.11	-	-
Eye allergies	2,340	1.73	2,062	2.00	263	.84	15	1.60
Eye complications of diabetes	850	.63	594	.58	245	.78	11	1.17
Eye inflammations	19,842	14.64	17,034	16.52	2,615	8.31	193	20.53
Refractive errors	36,717	27.10	32,948	31.96	3,641	11.58	128	13.62
Corneal ulcer and opacity	1,255	.93	980	.95	267	.85	8	.85
Strabismus	5,024	3.71	4,834	4.69	169	.54	21	2.23
Cataract	9,096	6.71	2,630	2.55	6,384	20.30	82	8.72
Detachment of retina	549	.41	318	.31	229	.73	2	.21
Glaucoma	9,474	6.99	4,314	4.18	5,077	16.14	83	8.83
All other diseases of the eye	18,786	13.87	12,475	12.10	6,199	19.71	112	11.91
Blind, both eyes	409	.30	216	.21	193	.61	-	-
Blind, one eye	126	.09	82	.08	44	.14	-	-
Congenital eye disorders	636	.47	609	.59	27	.09	-	-
Ophthalmia neonatorum and vision symptoms	658	.49	510	.49	148	.47	-	-
Open wound of eye	1,741	1.28	1,673	1.62	54	.17	14	1.49
Abrasion of cornea and eye	2,868	2.12	2,701	2.62	138	.44	29	3.09
Foreign body in eye and adnexa	8,101	5.98	7,881	7.64	163	.52	57	6.06
Other injury to eye and optic nerve	2,163	1.60	2,109	2.05	23	.07	31	3.30
Routine eye exam	1,887	1.39	1,665	1.61	208	.66	14	1.49
Surgical after-care, eye operations	11,199	8.27	6,156	5.97	4,942	15.71	101	10.74
Medical aftercare eye diseases	540	.40	392	.38	148	.47	-	-
Other eye care	269	.20	171	.17	96	.31	2	.21
	135,495	100.02	103,102	100.00	31,453	100.01	939	99.89

NDTI Table B - Diagnostic Distributions for Total Physician Visits by Age and Sex - Females

Diagnostic Group	All Ages		< 65		65 +		Age Unspecified	
	No.	%	No.	%	No.	%	No.	%
Grand Total	174,342	100.00	116,765	100.00	56,443	100.00	1,134	100.00
Infective & parasitic diseases of the eye	292	.17	147	.13	141	.25	4	.35
Special group	827	.47	760	.65	67	.12	-	-
Neoplasms of eye	213	.12	149	.13	60	.11	4	.35
Eye allergies	4,309	2.47	3,494	2.99	790	1.40	25	2.20
Eye complications of diabetes	1,327	.76	718	.61	597	1.06	12	1.06
Eye inflammations	24,079	13.81	18,850	16.14	5,048	8.94	181	15.96
Refractive errors	54,033	30.99	47,172	40.40	6,675	11.83	186	16.40
Corneal ulcer and opacity	1,348	.77	941	.81	400	.71	7	.62
Strabismus	5,376	3.08	5,064	4.34	300	.53	12	1.06
Cataract	15,894	9.12	3,418	2.93	12,315	21.82	161	14.20
Detachment of retina	455	.26	258	.22	197	.35	-	-
Glaucoma	14,373	8.24	5,020	4.30	9,196	16.29	157	13.84
All other diseases of the eye	26,813	15.38	15,839	13.56	10,780	19.10	194	17.11
Blind, both eyes	551	.32	155	.13	375	.66	21	1.85
Blind, one eye	120	.07	66	.06	54	.10	-	-
Congenital eye disorders	572	.33	532	.46	23	.04	17	1.50
Ophthalmia neonatorum and vision symptoms	689	.40	567	.49	117	.21	5	.44
Open wound of eye	567	.33	516	.44	51	.09	-	-
Abrasion of cornea and eye	2,225	1.28	2,049	1.75	155	.27	21	1.85
Foreign body in eye and adnexa	1,115	.64	1,012	.87	99	.18	4	.35
Other injury to eye and optic nerve	859	.49	768	.66	85	.15	6	.53
Routine eye exam	2,748	1.58	2,371	2.03	366	.65	11	.97
Surgical after-care, eye operations	14,363	8.24	6,054	5.18	8,204	14.54	105	9.26
Medical aftercare eye diseases	751	.43	544	.47	207	.37	-	-
Other eye care	442	.25	302	.26	140	.25	-	-
	174,341	100.00	116,766	100.01	56,442	100.02	1,133	99.90

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Intermediate Table M
NDTI Table B - Diagnostic Distributions for Total Physician Visits by Age and Sex - Sex Unspecified

Diagnostic Group	All Ages		<65		65+		Age Unspecified	
	No.	%	No.	%	No.	%	No.	%
Grand Total	9,348	100.00	4,775	100.00	1,781	100.00	2,792	100.00
Infective & parasitic diseases of the eye	7	.07	3	.06	-	-	3	.11
Special group	25	.27	15	.31	-	-	10	.36
Neoplasms of eye	12	.13	4	.08	-	-	8	.29
Eye allergies	283	3.03	150	3.14	20	1.12	113	4.05
Eye complications of diabetes	38	.41	11	.23	11	.62	16	.57
Eye inflammations	1,604	17.16	939	19.66	167	9.38	498	17.84
Refractive errors	2,468	26.40	1,678	35.14	246	13.81	544	19.48
Corneal ulcer and opacity	112	1.20	56	1.17	27	1.52	29	1.04
Strabismus	318	3.40	255	5.34	2	.11	61	2.18
Cataract	627	6.71	118	2.47	339	19.03	170	6.09
Detachment of retina	24	.26	4	.08	9	.51	12	.43
Glaucoma	834	8.92	176	3.69	351	19.71	307	11.00
All other diseases of the eye	1,303	13.94	639	13.38	302	16.96	362	12.97
Blind, both eyes	19	.20	3	.06	8	.45	8	.29
Blind, one eye	-	-	-	-	-	-	-*	-
Congenital eye disorders	36	.39	34	.71	-	-	2	.07
Ophthalmia neonatorum and vision symptoms	33	.35	11	.23	4	.22	18	.64
Open wound of eye	77	.82	29	.61	-	-	48	1.72
Abrasion of cornea and eye	164	1.75	79	1.65	-	-	85	3.04
Foreign body in eye and adnexa	301	3.22	195	4.08	5	.28	101	3.62
Other injury to eye and optic nerve	99	1.06	60	1.26	6	.34	33	1.18
Routine eye exam	121	1.29	74	1.55	10	.56	37	1.33
Surgical aftercare, eye operations	778	8.32	224	4.69	258	14.49	296	10.60
Medical aftercare eye diseases	41	.44	14	.29	10	.56	17	.61
Other eye care	22	.24	5	.10	3	.17	14	.50
	9,346	99.98	4,776	99.98	1,778	100.01	2,792	100.01

* Group of those blind in one eye had no unspecified sex listing.

Intermediate Table N

Affection Breakdown for Least Disabling Conditions

Type of Eye Affection	Under 65 years		65 years +		White	All Other
	Males	Females	Males	Females		
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Glaucoma	4.28	4.38	16.61	16.73		
Cataract - prenatal	.14	.11	0	0		
Cataract - other	6.25	6.14	30.04	30.83		
Retinal dis. - prenatal	.09	.07	0	0		
Retinal dis. - diabetic	.58	.61	.78	1.06		
Retinal dis. - other	2.97	3.14	5.30	4.75		
Retrolental fibroplas.	0	0	0	0		
Myopia	9.27	11.72	3.36	3.43		
Cornea or Sclera	3.66	2.48	2.17	.97		
Uveitis	2.97	2.91	1.50	1.61		
Optic Nerve Dis.	.12	.14	.20	.19		
Multiple Affections	0	0	0	0		
Refractive errors involving lesser visual disability	22.69	28.68	8.22	8.40		
Other	46.69	39.43	31.07	31.27		
Unknown	.29	.19	.75	.76		

The first four columns were obtained by putting together the percentages in the corresponding age-sex groups from the NDTI Total Physician Visits data in NDTI Table B. The 15 NDTI groupings were converted to the 15 groups above (the MRA groups plus one additional) using the regrouping rules shown earlier. These will be used for providing a diagnostic breakdown for Disability Category A minus Disability Category B.

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Intermediate Table O

Intermediate Computations - Diagnostic Distributions by Age, Sex, and Race of Estimates for Category A Minus Category B

Type of Eye Affection	Estimated Number of Persons (in Thousands) with Lesser Visual Disability - U.S. 1972										
				0-64 Years			65+ Years				
	Total	Males	Females	Total	Males	Females	Total	Males	Females	White	All Other
All Affections	9176	4758	4418	5404	3379	2025	3772	1379	2393	8249	927
Glaucoma	863	374	489	233	145	89	629	229	400	749	114
Cataract-prenatal	7	5	2	7	5	2	0	0	0	6	1
Cataract-other	1487	625	862	335	211	124	1152	414	738	1395	93
Retinal Disorder - prenatal	4	3	1	4	3	1	0	0	0	4	1
Retinal Disorder - diabetic	68	30	38	32	20	12	36	11	25	63	5
Retinal Disorder - other	351	173	177	164	100	64	187	73	114	337	13
Retrolental Fibroplasia	0	0	0	0	0	0	0	0	0	0	*
Myopia	679	360	319	550	313	237	128	46	82	613	66
Cornea or Sclera	227	154	73	174	124	50	53	30	23	197	30
Uveitis	218	121	97	159	100	59	59	21	38	192	27
Optic nerve Disease	14	7	7	7	4	3	7	3	4	12	2
Multiple Affections	0	0	0	0	0	0	0	0	0	0	
Refractive Errors with lesser Disability	1662	880	782	1347	767	581	314	113	201	1563	99
Other	3553	2006	1547	2376	1578	798	1177	428	748	3078	475
Unknown	42	20	22	14	10	4	28	10	18	39	3

Intermediate Table P
Intermediate Computation
Estimated Number of Persons (in Thousands) by Disability Level and Type of Affection - U.S. - 1972

Worksheet for "All Other" Estimates

Type of Eye Affection	Severe Visual Impairment Prev. Rate/100,000 Total (1)	Severe Visual Impairment Prev. Rate/100,000 All Other (2)	Ratio (2)/(1) (3)	Lesser Visual Disability Prev. Rate/100,000 Total (4)	Estimated Prev. Rate Lesser Disability For All Other (5)= (3)x(4)	% of Dist. (5) (6)	Estimated Number of Persons with Lesser Disab. All Other (6)x1,045 = (7)
All Affections	757	1,109	1.46	4,671			
Glaucoma	103	233	2.26	433	979	12.27	128
Cataract-prenatal	18	43	2.39	3	7	.09	1
Cataract-other	91	97	1.07	745	797	9.99	104
Retinal Disorder - prenatal	39	43	1.10	2	2	.03	*
Retinal Disorder - diabetic	36	47	1.31	34	45	.56	6
Retinal Disorder - other	125	81	.65	177	115	1.44	15
Retrolental Fibroplasia	10	8	.80	*	*	*	*
Myopia	19	31	1.63	349	569	7.13	75
Cornea or Sclera	34	74	2.18	117	255	3.20	33
Uveitis	34	70	2.06	112	231	2.90	30
Optic nerve Disease	56	128	2.29	7	16	.20	2
Multiple Affections	45	47	1.04	-	-	-	-
Refractive Errors	-	-	-	853	853	10.69	112
Other	55	124	2.25	1,816	4,086	51.22	535
Unknown	91	89	.98	22	22	.28	3
				Total	7,977	100.00	1,044

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Intermediate Table Q

Intermediate Computations
Estimating Total Line D Rates for 1972

Total number blind (from Table 1 in Hatfield paper): 467,800 = 224.7 per 100,000

Total provisional males = $\frac{224.7}{203.7}$ x 193.9 (from Table 2) x 996.01 (male pop./100,000)

SEX = 1.10309 x 193.9 x 996.01 = 213,036 — 463.727

Total provisional females = 1.10309 x 212.9 x 1,067.46 = 250,691

Forcing agreement Males $\frac{467,800}{463,727}$ x 213,036 =

Females ditto x 250,691 =

Total provisional white = 1.10309 x 168.4 x 1,805.67 = 335,422

RACE Total provisional non-white = 1.10309 x 348.9 x 257.79 = 99,215 — 434,637

Forcing agreement Whites $\frac{467,800}{434,637}$ x 335,422 = 361,015

Non-whites ditto x 99,215 = 106,785

467,800

Total provisional < 65 = 1.10309 x 109.56* x 185,410 = 224,076

AGE Total provisional 65 + = 1.10309 x 1,012.08* x 20,937 = 233,744 — 457,820

Forcing agreement < 65 $\frac{467,800}{457,820}$ x 224,076 = 228,961

65 + ditto x 233,744 = 238,839

467,800

Breaking age-groups by sex

					Male	Female	Total
< 65 yrs.	Males $\frac{28,495**}{51,802}$ = 55.01%	Females = 44.99%	125,951	103,010	228,961
65 + yrs.	Males $\frac{18,214**}{44,450}$ = 40.98%	Females = 59.02%	97,876	140,963	238,839
			223,827	243,973	467,800

* Obtained by consolidating age groups in Table 2 of Hatfield paper.

** Data from top three lines of Table 22b in 1969-1970 MRA report.

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5. DATA ON HOSPITALIZATION AND AMBULATORY CARE

5.1 Evaluation of Fxisting Data

The statistics available on in-patient care in short-term hospitals, on operations, and on ambulatory care in doctors' offices are perhaps the most reliable of the various types with which this study has dealt. Nevertheless, these too have certain shortcomings and gaps which we shall deal with briefly.

First, as to the major sources, it was surprising to the study staff to find how little in the way of relevant statistics could be provided by the various insurance systems, and public programs such as Medicaid. We have referred earlier to the impossibility of securing ambulatory care statistics from Medicare SMI claims, though Medicare hospitalization data are available in detail. Statistics from private insurance plans are also difficult to secure. In some instances, notably the Blue Cross plans, there is insufficient knowledge of the number and characteristics of the eligible population. In others, classification by diagnosis is not performed in such a way as to permit a focus on eye diseases and injuries. In still others, particularly the Medicaid systems, there is no uniformity or central collection of the statistics on services provided. A few of the prepayment group practice plans, particularly the Kaiser Foundation plans, are an exception to this, but they too are limited as regards statistics on ambulatory care.

The best sources, we believe, are the surveys, namely HDS and NAMCS in NCHS, and NDTI operated by IMS, and the abstracting systems for hospital data, particularly the Professional Activities Study (PAS) operated by the Commission

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on Professional and Hospital Activities (from which national estimates are made by IMS under contract with CPHA). The Health Interview Survey can also be considered a major source of statistics on health care service, with some advantages and some disadvantages when compared to the record-based systems.

Despite these large and elaborate data systems, there are still gaps from the standpoint of the needs of the National Eye Institute. We shall enumerate these with a minimum of elaboration:

a) There is a gap in the coverage of these data systems, namely services provided by independent clinics and out-patient departments. The only attempt to cover these is in the HIS, but the data lack needed detail, particularly for eye care.

b) There is also a gap in the area of long-term care. NCHS has conducted surveys of patients in nursing homes, but it is difficult to determine which of the patients in these institutions are there primarily because of an eye problem.

c) The ambulatory care data as exemplified by NAMCS and NDTI are limited in usefulness because they approach treatment on a piecemeal basis. The unit sampled is the visit, not the patient, so the totality of care for a particular patient cannot be observed. This is also true, of course, of the hospitalization data, the hospital stay being the analytical unit, but because of the medical history information available in the hospital medical record it is usually possible to determine the onset of the disease and the details of diagnosis and care.

d) The reliance on medical records makes it difficult to associate medical care with socio-economic characteristics of the patient. The records usually contain no more than age, sex, marital status and place of residence. Race is often only determinable by delving into the medical history. Other characteristics of interest, such as income level, occupation, educational status, disability and labor force status cannot be obtained without an inquiry in the household. (The Health Interview Survey does not have this disadvantage but lacks the kinds of detail about diagnosis and treatment that are often needed.)

5.2 Presentation and Comments on Estimates of Medical Care Services used in Eye Care

There are several precautions that must be noted in relation to Tables 5-10 presented here. First, like sections 3.2 and 4.2, this section should not be separated from the tables on Medical Care Services. Secondly, it should be noted that four of the tables relate to a different year from the other tables. Tables 5 and 6 were obtained from the new National Ambulatory Medical Care Survey (supplemented in the case of Table 5 by data from the National Disease and Therapeutic Index). NAMCS began to collect final data on May 1, 1973, so the first year relates to the 12 months ending April 30, 1974. The statistics from the Southern California Kaiser Foundation Plan relate to the calendar year 1974, as do also the statistics on eye operations from PAS.

The third important precaution is noted in footnote 2 of Table 6. The second column showing percentage distributions of visits for care of eye diseases excludes eye injuries, and eye diseases not classified in the Diseases of the Eye section of the International Classification. General eye examinations and after-care are also excluded from this table. As can be seen in Table 5, these categories amount to about 22 percent of all the eye visits.

Fourth, it should be repeated here that the visit statistics exclude visits to patients in hospitals and nursing homes and "encounters" in clinics and out-patient departments. (The former are excluded in NAMCS but not in the NDTI system. Both surveys include only the "encounters" of private patients with office-based physicians.)

Fifth, the statistics on days of care in short-term hospitals in Table 8 do not include all the eye diseases but only those in the ICDA categories 360-379. It was possible to

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rectify this exclusion in Table 7, which shows patients discharged, by making use of the national estimates supplied by IMS America, LTD., based on data from the Professional Activities Studies abstracting system, but the table supplied for the study by IMS did not include the aggregate number of hospital days. The number of discharged patients for the excluded categories in Table 8 amount to only about four percent of the total, so the effect on the total number of hospital days is not great.

The discharge rates and days of care rates shown in Table 9 are self-explanatory, except that the rates by sex for the age-group 65 years and over were based on a crude estimate of the eligible population. The Medicare cases are included in the numerators but the sex distribution of the Medicare population was not known and was estimated, assuming it to be the same as the non-Medicare population in this age group.

Table 10 is taken directly from national estimates provided by IMS America, LTD., based on PAS data. The groupings by type of operation were designed to show separately only the most frequent of the many types of eye operations. Operations not performed in hospitals are excluded.

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Table 5. Estimates of Number of Office Visits for Diseases of Vision, Eye Injuries, and Other Eye Care by Principal Diagnosis or Reason for Visit: United States Year Ending April 30, 1974 1/

Diagnosis or Reason for Visit	Estimated Number Visits (in Thousands)
Eye Inflammations (360-369)	5,297
Refractive Errors (370)	9,175
Strabismus (373)	1,234
Cataract (374)	2,723
Glaucoma (375)	1,941
All Other Specific Eye Diseases (371, 372, 377-379)	3,807
Eye Infections, Eye Neoplasms, Eye Allergies, Eye Complications of Diabetes, Congenital Eye Disorders, and Eye Symptoms 2/	1,248
Eye Injuries (870, 871, 921, 930, 940, 950 Plus Estimate for Abrasions of Cornea and Eye 3/	2,460
Eye Examinations, and Medical or Surgical Aftercare of Eye (Y00.6 plus estimate) 4/	3,270
All Categories	31,155

1/ Based upon statistics from the National Ambulatory Medical Care Survey and all-visit statistics from the National Disease and Therapeutic Index.

2/ Estimated from NDTI data. The data from NAMCS were either not tabulated in sufficient detail to provide these categories, or they were not classified separately at all in the ICDA (8th revision).

3/ Abrasions of the cornea and eye are not classified separately in the ICDA (8th revision) so this category was estimated from NDTI data.

4/ Medical and surgical aftercare of the eye are not classified separately in the ICDA (8th revision) so this category was estimated from NDTI data.

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Table 6. Estimated Percentages of Office Visits for Vision Disorders According to Various Characteristics of the Patient, the Physician, and the Visit: United States, Year Ending April 30, 1974. 1/

Characteristics	Total Office Visits (in thousands)		Refractive Errors 9,175	Other Specific Eye Diseases 2/ 15,002
Sex of Patient	Percent	Male	35.1	39.9
		Female	64.9	60.1
Race of Patient	Percent	White	92.6	90.5
		All Other	7.4*	9.5
Age of Patient	Percent	Under 15 years	18.8	17.7
		15-24 years	19.0	7.6
		25-44 years	17.9	9.3
		45-64 years	32.7	29.5
		65+ years	11.6	36.0
Physician Specialty	Percent	General practice	*	11.3
		Medical specialties	*	*
		Surgical specialities 3/	99.3	82.7
		Other specialities	*	*
Time Spent With Physician by this Patient	Percent	Under 6 minutes	1.7*	15.6
		6-10 minutes	17.5	32.2
		11-15 minutes	22.2	26.7
		16+ minutes	58.6	25.5

* These figures do not meet NCHS standards for sampling reliability.

1/ Based upon statistics from the National Ambulatory Medical Care Survey.

2/ Includes only ICDA (8th revision) categories 360-369 and 371-379.

3/ Includes ophthalmologists.

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Table 7. Estimated Number of Persons Discharged from Short-stay Hospitals* with an Eye Disease or Injury as the First-listed Diagnosis, by Age, Sex, and Diagnosis: United States, 1972**

agnostic Category and CDA Numbers	All Ages			Under 15 Years		15 - 44 Years		45 - 64 Years		65+ Years	
	Both Sexes	Males	Females	Males	Females	Males	Females	Males	Females	Males	Female
l Eye Diseases and njuries 1/	567,000	270,100	297,000	60,800	47,200	51,900	36,800	60,900	67,500	96,500	145,50
ecial roup 2/	11,900	5,100	6,800	200	200	3,300	4,400	1,400	1,900	200	20
oplasms of ye 3/	4,000	2,600	1,400	600	300	1,000	500	600	300	500	30
e Inflammations 4/	30,200	14,000	16,200	5,700	6,400	3,400	3,300	2,600	3,100	2,300	3,50
rabismus 5/	74,800	42,000	32,800	32,100	25,400	7,500	5,200	1,800	1,500	600	70
taract (excludes conenital) 6/	283,000	116,600	166,400	1,100	1,300	9,200	9,400	32,800	40,000	73,500	115,70
aucoma (excludes conenital) 7/	25,400	11,000	14,500	200	200	1,700	1,700	3,800	4,500	5,200	8,00
tinal Diseases 8/	28,900	15,400	13,500	800	700	3,400	2,300	6,500	5,500	4,700	5,10
l Other Eye isorders 9/	58,900	25,900	33,000	5,100	6,100	6,900	7,200	7,500	9,500	6,300	10,10
ngenital ye Disrders 10/	11,300	5,700	5,600	3,300	3,300	1,000	1,000	700	700	700	70
e Symptoms nd "Blindess NOS" 1/	7,700	3,200	4,500	300	400	1,200	1,600	1,100	1,500	700	1,00
e Injuries 12/	42,700	33,600	9,100	11,600	3,200	16,700	4,600	3,400	900	1,800	50

Excludes newborn infants and patients in Federal hospitals. The inclusion of discharges of civilians from Federal hospitals would add about 5 percent to the figures in this table.

Based upon statistics from the Hospital Discharge Survey subdivided into more detailed disease and injury categories using data from the Professional Activities Study (inflated to national estimates by IMS, America, LTD.)

Totals exclude the special group.

Includes histoplasmosis, toxoplasmosis, and sarcoidosis (most are in the last category). These cases do not necessarily involve the eye. The ICDA codes do not make a distinction. ICDA Numbers 115, 130 and 135.

ICDA Numbers 190, 224 and 238.0.

ICDA Numbers 360 - 369.

ICDA Number 373.

ICDA Number 374.

ICDA Number 375.

ICDA Numbers 376, 377.0 - 377.4.

All other ICDA Numbers in 370 - 379 range plus 053.0 and 078.

ICDA Number 744.

ICDA Numbers 781.0 - 781.2 plus 379.

ICDA Numbers 870, 871, 921, 930, 940 and 950.

Table 8. Estimated Number of Days of Care for Patients Discharged from Short-stay Hospitals* for Major Categories of Eye Diseases and Injuries, by Sex: United States, 1972 **

Category	Both Sexes	Males	Females
Eye Diseases (exclusive of infections, neoplasms, congenital and symptoms)	2,973	1,281	1,690
Eye Injuries	228	182	46
Combined Groups	3,201	1,463	1,736

* Excludes newborn infants and patients in Federal hospitals. See also corresponding note on Table 7.

** Based upon statistics from the Hospital Discharge Survey.

Note: Subgroups do not add to totals shown because of rounding.

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Table 9. Hospital Discharge Data for Eye Diseases and Injuries from the Kaiser Foundation Plan in Southern California, 1974[1]

(Rates per 1,000 eligible population)

Disease Groups and Age		Discharges			Days of Care		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Infections of eye	All ages	.01	.01	.01	.09	.08	.09
	0-4 yrs	.01	-	.05	.14	-	.29
	5-14	.01	-	.01	.16	-	.33
	15-24	-	-	-	-	-	-
	25-44	-	-	-	-	-	-
	45-64	-	-	-	-	-	-
	65 +	.11	.17	.05	1.04	1.97	.05
Special group[2]	All ages	.07	.03	.11	.40	.16	.64
	0-4 yrs	.01	.02	-	.04	.07	-
	5-14	-	-	-	-	-	-
	15-24	.05	.03	.06	.16	.10	.21
	25-44	.15	.04	.25	.77	.19	1.33
	45-64	.07	.05	.09	.56	.41	.70
	65 +	.07	-	.14	.86	-	1.77
Neoplasms of eye	All ages	.02	.02	.02	.08	.10	.05
	0-4 yrs	.06	.05	.07	.08	.09	.07
	5-14	.01	.01	-	.01	.01	-
	15-24	.01	.01	-	.01	.02	-
	25-44	.02	.01	.02	.06	.03	.09
	45-64	.03	.01	.04	.07	.04	.12
	65 +	.09	.17	-	.86	1.66	-
Eye inflamations	All ages	.17	.16	.17	1.50	1.20	1.79
	0-4 yrs	.82	.74	.91	5.57	4.70	6.49
	5-14	.06	.06	.05	.42	.21	.63
	15-24	.07	.07	.06	.58	.25	.89
	25-44	.08	.08	.08	.44	.46	.42
	45-64	.16	.12	.20	1.99	.91	3.06
	65 +	.56	.70	.42	8.42	9.94	6.79

160091

Table 9. Hospital Discharge Data for Eye Diseases and Injuries from the Kaiser Foundation Plan in Southern California, 1974[1] (Cont'd)

(Rates per 1,000 eligible population)

Disease Groups and Age		Discharges			Days of Care		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Strabismus	All ages	.28	.25	.32	.62	.54	.69
	0-4 yrs	1.07	.88	1.28	1.81	1.51	2.14
	5-14	.54	.55	.53	.94	1.00	.86
	15-24	.15	.13	.16	.42	.28	.55
	25-44	.13	.08	.17	.29	.27	.31
	45-64	.12	.07	.16	.51	.41	.60
	65 +	.09	-	.19	.54	-	1.12
Cataract (excludes congenital)	All ages	.66	.77	.56	3.69	4.17	3.22
	0-4 yrs	.01	.02	-	.04	.07	-
	5-14	.01	.02	.01	.06	.06	.05
	15-24	.05	.09	.01	.18	.35	.01
	25-44	.07	.10	.04	.30	.44	.17
	45-64	1.40	1.77	1.04	7.47	9.59	5.37
	65 +	8.48	8.36	8.61	50.00	47.56	52.55
Glaucoma (excludes congenital)	All ages	.25	.26	.25	2.17	2.43	1.92
	0-4 yrs	-	-	-	-	-	-
	5-14	-	-	-	-	-	-
	15-24	.01	.03	-	.12	.24	-
	25-44	.05	.04	.05	.24	.22	.26
	45-64	.47	.45	.50	4.24	4.69	3.80
	65 +	3.47	3.46	3.49	29.94	32.54	27.18
Retinal diseases	All ages	.16	.17	.15	1.17	1.37	.98
	0-4 yrs	.04	.02	.05	.13	.07	.20
	5-14	.01	.03	-	.07	.15	-
	15-24	.04	.04	.05	.24	.19	.29
	25-44	.10	.08	.12	.53	.54	.52
	45-64	.36	.42	.30	2.59	2.96	2.21
	65 +	1.06	1.05	1.07	10.33	12.74	7.77

25C000 82

Table 9. Hospital Discharge Data for Eye Diseases and Injuries from the Kaiser Foundation Plan in Southern California, 1974 - (Cont'd)

(Rates per 1,000 eligible population)

Disease Groups and Age		Discharges			Days of Care		
		Both Sexes	Males	Females	Both Sexes	Males	Females
All other specific eye diseases	All ages	.27	.29	.25	1.56	1.71	1.40
	0-4 yrs	.36	.37	.34	.82	.74	.91
	5-14	.13	.16	.10	.43	.54	.32
	15-24	.04	.06	.02	.11	.19	.03
	25-44	.19	.21	.17	.93	1.19	.69
	45-64	.43	.43	.44	2.60	1.88	3.30
	65 +	1.58	1.58	1.58	14.35	18.60	9.87
Congenital eye disorders	All ages	.06	.08	.05	.21	.29	.12
	0-4 yrs	.38	.46	.29	1.17	1.67	.64
	5-14	.08	.09	.07	.23	.32	.14
	15-24	.02	.01	.03	.04	.02	.06
	25-44	.01	-	.01	.02	-	.05
	45-64	.03	.04	.02	.10	.17	.04
	65 +	.13	.22	.05	.79	1.18	.37
Eye symptoms & "Blindness" NOS	All ages	.13	.16	.11	1.34	1.48	1.19
	0-4 yrs	.06	.07	.05	1.09	1.07	1.11
	5-14	.01	.02	.01	.15	.28	.01
	15-24	.04	.04	.04	.14	.21	.08
	25-44	.07	.04	.09	.62	.16	1.07
	45-64	.27	.32	.22	2.57	2.60	2.53
	65 +	1.04	1.44	.60	12.12	17.21	6.70

000093

Table 9. Hospital Discharge Data for Eye Diseases and Injuries from the Kaiser Foundation Plan in Southern California, 1974 - (Cont'd)

(Rates per 1,000 eligible population)

Disease Groups and Age		Discharges			Days of Care		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Eye injuries	All ages	.16	.24	.09	1.00	1.34	.66
	0-4 yrs	.23	.28	.17	1.46	1.97	.91
	5-14	.29	.43	.15	1.53	2.36	.67
	15-24	.17	.26	.08	.97	1.14	.81
	25-44	.10	.14	.07	.51	.67	.35
	45-64	.08	.13	.04	.86	.79	.92
	65 +	.20	.31	.09	1.71	2.93	.42

ENROLLED POPULATION

	Both Sexes	Males	Females
All ages	1,090,831	542,396	548,435
0-4 yrs	83,803	43,146	40,657
5-14	225,464	115,090	110,374
15-24	198,052	96,171	101,881
25-44	316,252	154,181	162,071
45-64	222,943	110,976	111,967
65 +	44,317	22,832	21,485

[1]Based upon statistics supplied by the Plan for principal diagnoses only. Disease groupings are the same as in Table 7 for the United States, except that eye infections are shown separately.

[2]This includes histoplasmosis, toxoplasmosis, and sarcoidosis and is not confined to cases involving the eye, since the ICDA codes do not make this distinction.

000054

Table 10. Estimated Numbers of Ophthalmological Operations Performed in Hospitals in the United States: 1974 1/

Type of Operation	H-ICDA Nos.	Operations Performed As --	
		Primary Procedure	Seccndary Procedure
Operations on lacrimal apparatus	08	13,000	2,000
Excision of lesion, eyelid	09.1	21,000	9,000
Other operations, eyelids	09.0, .2-.9	42,000	26,000
Ocular muscle resection	10.1	27,000	6,000
Ocular muscle advancement	10.2	31,000	5,000
Other operations, ocular muscles	10.0, .3-.9	3,000	2,000
Operations on conjunctiva	11	5,000	3,000
Operations on cornea	12	19,000	6,000
Operations on sclera, anterior chamber, iris, & ciliary body	13-14	29,000	36,000
Extraction of lens, intracapsular	15.4	305,000	3,000
Extraction of lens, extracapsular	15.5	14,000	1,000
Cataract extraction, other and NOS	15.3, 15.6	13,000	2,000
Other operations, lens	15.0-.3, 15.7-9	4,000	5,000
Repair of retina	16.1-.4	26,000	5,000
Other operations, retina, choroid and vitreous	16.0, 16.5-.7	4,000	4,000
Operations on orbit and eyeball	17	19,000	7,000
	Totals	575,000	122,000

1/ Based on national estimates from PAS data prepared by IMS America, LTD.

000035

5.3 Methodolgical Documentation of Data on Hospitalization and Ambulatory Care

The documentation of the estimates of physician visits for eye care is relatively simple. The estimates come directly from the first year of data collection in the National Ambulatory Medical Care Survey with certain exceptions. These exceptions were necessary for three reasons:

a) Some eye conditions that were separately classified in the ICDA 7th revision were not separately classified in the 8th revision used for NAMCS. An example is "eye allergies," which accounted for 1,386,000 visits in the NDTI data.

b) The NDTI classification which is based on, but more detailed, than the 7th revision permits extracting data for eye conditions that would not be available using either the 8th or the 7th revision. An example is "abrasion of the cornea."

c) The NAMCS data now available have not yet been tabulated as completely as one would like for studying a group of diseases such as this.

There are wide differences between the national estimates produced by NAMCS and NDTI. However, the relationship between the frequency of visits for any one disease from the two sources is very regular. If one takes .493 times the NDTI estimate for a disease category, that is comparable between the two classifications, one obtains a fairly close approximation of the corresponding NAMCS estimate. This relationship is illustrated in Intermediate Table R and Chart S attached. The line described by Y = .493x is not a least-squares fitted line. It is simply intended to show visually that the relationship (obtained by computing the ratio of total NAMCS visits to total NDTI visits or all comparable categories) fits the data reasonably well.

Thus, it was possible to use data from NDTI to make reasonable estimates for the data missing from NAMCS. This was the basis for estimating certain categories in Table 5. Table 6 data, however, were extracted directly from published statistics of NAMCS.

000066

Intermediate Table R

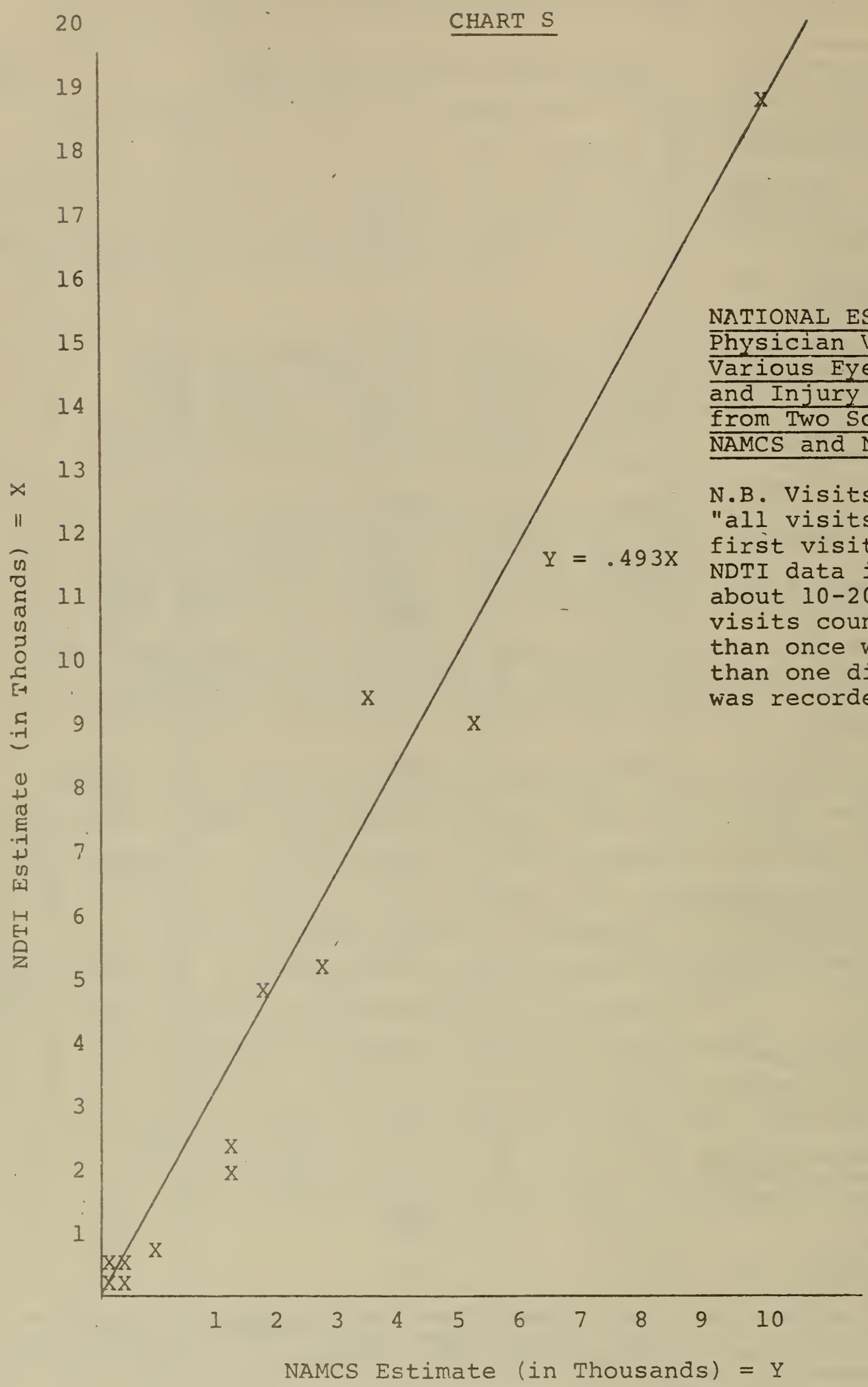
Comparison of Estimates from NAMCS and NDTI by Diagnosis or Reason for Visit

Title and ICDA Inclusions (8th Rev.)	Estimated Number Visits (In Thousands) NAMCS	NDTI (all visits)	Ratio	NAMCS / NDTI
Eye Infections (053.0, 076-078, 098.2)	N.A. 1/	111	--	
Special Group (115, 130.0, 130.1, 135)	N.A.	290	--	
Eye Neoplasms (190, 224, 238.0)	N.A.	67	--	
Eye Allergies (not separately classified)	N.A.	1,386	--	
Eye Complications of Diabetes (not separately classified)	N.A.	443	--	
Eye Inflammations (360-369) 2/&3/	5,297	9,105	.58	
Refractive Errors (370)	9,175	18,644	.49	
Corneal opacity 2/ (371)	103	543	.19	
Strabismus (373)	1,234	2,144	.58	
Cataract (374)	2,723	5,123	.53	
Glaucoma (375)	1,941	4,936	.39	
Detachment of Retina (376)	246	206	1.19	
All Other Eye Diseases (372, 377, 378)	3,610	9,380	.38	
Blindness, One or Both Eyes (379)	94	244	.39	
Congenital Eye Disorders (744)	58	249	.23	
Ophthalmia Neonatorum and Vision Symptoms (781.0-781.2)	N.A.	276	--	
Open Wound of Eye (870)	204	477	.43	
Abrasion of Cornea and Eye 4/	N.A.	1,051	--	
Foreign Body in Eye and Adnexa (930)	1,233	1,903	.65	
Other Injury to Eye and Optic Nerve (921, 871, 940, 950)	505	624	.81	
Eye Examination, and Medical and Surgical Aftercare of Eye 5/ (Y00.6)	N.A.	6,632	--	
Totals for Comparable Lines	26,423	53,578	.493	

1/ Not Available.
2/ Corneal ulcer was included under inflammations in the 8th revision whereas in the earlier code it had a separate number adjoining that for corneal opacity.
3/ Ophthalmia neonatorum was included under inflammations in the 8th revision whereas in the earlier code it had a separate three-digit category under "diseases of early infancy."
4/ There is no separate category in the ICDA for this NDTI title.
5/ Medical and surgical aftercare of the eye are not separately classified in the ICDA (8th revision). Y00.6 being a fourth digit category can not be separately extracted in the NAMCS data.

000097

CHART S



NATIONAL ESTIMATES OF Physician Visits for Various Eye Disease and Injury Categories from Two Sources: NAMCS and NDTI.

N.B. Visits are "all visits", not first visits only. NDTI data include about 10-20% of visits counted more than once when more than one diagnosis was recorded.

000038

In the case of the hospitalization estimates, the process was slightly more complicated. The plan was to present a table showing hospitalizations (discharges from the hospital) for all short-stay hospitals in the U.S. and days of care by age, sex, and diagnostic category. (Race data are not recorded on many hospital records so it was decided not to attempt a race breakdown.) This table was to be made starting with gross totals by age and sex for eye diseases and for injuries from the Hospital Discharge Survey, and then using the far more detailed statistics from the Professional Activity Study (which have been inflated to national estimates by IMS, America, LTD. (PAS-IMS) to produce the diagnostic breakdowns.

However, there were several problems in doing this:

a) The PAS-IMS data supplied to us for the study were in the form of a standard computer printout. This did not show age crossed with sex and contained only a + mark for any estimate less than 500. All other estimates were rounded to the nearest 1,000. (The + marks and the rounding made it difficult to combine small categories into larger ones). Also, the age groupings shown were not those requested and, hence, did not correspond to those into which the HDS data were grouped. Finally, there were no figures presented on hospital days but only a distribution of cases by length of stay in rather coarse class intervals.

b) The PAS-IMS data did reveal to us that our request for data from HDS had omitted some important categories of eye diseases. The request to NCHS included only diseases classified in the ICDA range 360-379 and the eye injuries, but PAS-IMS showed the following:

infections and parasitic[1], eye	14,000 discharges
neoplasms, eye	4,000 discharges
congenital, eye	11,000 discharges
symptoms, eye and ophthalmia neonatorum	6,000 discharges

c) The HDS estimates for injuries were not shown by age because of sample-size limitations.

However, when the statistics on discharges for comparable groups were compared between the two sources, the agreement was quite close, as illustrated by the following:

	HDS	PAS-IMS
ICDA codes 360-379	500,000	545,000
ICDA injury codes	44,000	44,000

N.B. Only primary diagnoses are counted in each case. There is a slight lack of comparability in the injury code line, but the agreement is still close.

Accordingly, the decision was made to produce the table on hospital discharges from statistics supplied by HDS supplemented by the use of PAS-IMS data both to provide further diagnostic detail and to cover estimates not covered by the request for data from NCHS. For hospital days data, the reliance would be wholly on HDS and the table would have to show a minimum of diagnostic detail.

The estimates of hospital discharges and hospital days presented in the Tables exclude figures for federal hospitals. Federal short-term hospitals contributed approximately five percent of the total experience in short-term hospitals in the United States. It was decided to omit this experience because of the difficulty in securing uniform data for the various types of hospitals in this group: Veterans Administration, Defense Department, Indian Health Service, and Public Health Service hsopitals.

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[1] Most of this, however, was for sarcoidosis included only because of NEI interest and not confined to cases involving the eye, as explained elsewhere.

A further problem was found in converting H-ICDA codes, used in PAS-IMS, to ICDA codes used in HDS, but this proved relatively simple to handle because the PAS-IMS data were presented in 4th-digit detail.

The PAS-IMS age groups were recast into the desired age groupings using the assumption that the cases within an age group in the source data were evenly distributed by single years of age. This is not true, of course, but in view of the use to be made of the data (to compute percentage distributions by diagnosis within an age-sex category) it seemed adequate.

The handling of the sex breakdowns within age groups is less easily defended. There seemed to be no feasible alternative (beyond introducing a third set of data from another source) to assuming that the sex ratio exhibited by the all-ages totals for a given PAS-IMS diagnostic category held true for each age group as well. This was the assumption made. Fortunately, however, the most extreme sex ratio is found in the hospitalization data for eye injuries for which we had separate statistics from HDS.

In the end it was decided to use the PAS-IMS data for hospitalized eye injuries without change because both the numbers and the sex ratio agreed quite closely with the HDS figures. This was also the decision, as was indicated above, for those disease groups, such as neoplasms, for which we did not obtain HDS figures at all.

Thus, the statistics on discharged patients, like those on physician visits, are actually an amalgam of data from an NCHS survey and an outside source, the NCHS figures being the basis for the estimate wherever possible because of the more representative sample, but with substitution of or supplementation by the data from the other source where the NCHS survey numbers were too small or unavailable.

The summary of the PAS-IMS data employed in the hospitalization estimates is shown on the attached intermediate table. The details of the computations are available in the study files.

A comparison of statistics on eye operations from HDC (for 1972) and from national estimated based on PAS (for 1974) reveals that the differences are not great. The total estimated operations on the eye from the former source is 604,000 and from the latter 575,000. The inclusions appear to be the same for both sets of data but the classification by type of operation is different, though not as different as it might seem upon first glance. (The organization and numbering is different, but it is possible to match most of the detailed categories in the H-ICDA classification with a number in the ICDA code. The former is somewhat more detailed.)

The most important consideration, however, from the point of view of this study, is that the PAS data are based on much larger numbers of cases and, hence, could be shown in more detail than those from HDS. (The HDS statistics, however, are more closely representative of the United States and are based on probability sampling.)

It was decided to eliminate the use of the HDS operations statistics that appeared in the first draft of the report and rely instead on the PAS data received later.

A consolidation of the detailed type-of-operation classification was devised to show only the more frequent types of eye operations. This is what has been used in Table 10.

000102

Intermediate Table T

Summary of the PAS-IMS Data on Hospital Discharges

Diagnostic Category	All Ages	0 - 9	10-19	20-39	40-59	60-64	65+	Males	Females
Infection of the Eye	2,250	127.5	--	242.5	120.0	--	1,760.0	942.5	1,307.5
Special Group 1/	11,750	80.0	700.0	6,457.5	3,377.5	830.0	407.5	5,000.0	6,750.0
Neoplasms of the Eye	4,000	460.0	800.0	860.0	880.0	240.0	760.0	2,600.0	1,400.0
Eye Inflammations	29,750	8,402.5	2,320.0	4,550.0	6,002.5	1,640.0	7,047.5	12,662.5	17,097.5
Strabismus	63,000	39,730.0	9,880.0	7,330.0	3,950.0	640.0	1,630.0	32,190.0	30.810.0
Cataract (except congenital)	331,000	470.0	2,850.0	3,850.0	59,170.0	34,870.0	230,800.0	137,710.0	193,370.0
Glaucoma (except congenital)	29,250	120.0	480.0	1,480.0	7,622.5	3,400.0	16,147.5	12,380.0	16,870.0
Retinal Diseases	32,000	450.0	1,390.0	2,780.0	9,970.0	5,380.0	12,030.0	16,290.0	15,710.0
All Other Eye Diseases	60,000	6,330.0	5,047.5	7,820.0	18,572.5	4,510.0	17,892.5	24,545.0	35,455.0
Congenital Eye Disorders	11,250	6,150.0	890.0	1,110.0	1,490.0	240.0	1,460.0	5,700.0	5,580.0
Eye Symptoms and "Blindness NOS"	7,750	150.0	910.0	1,727.5	2,305.0	922.5	1,705.0	3,255.0	4,505.0
Eye Injuries	42,500	8,270.0	12,990.0	13,460.0	5,350.0	340.0	2,330.0	33,600.0	9,130.0
Totals	624,500	70,740.0	38,257.5	51,667.5	118,810.0	53.012.5	293,970.0	286,875.0	337,985.0

1/ As noted before, these include cases not related to the eye.

Source: These data are from the worksheets, prepared by Dana, from the original computer printout from IMS. Age groups 0-2 years and 3-9 years have been combined. The totals for "All Ages" have been rounded to the nearest 250. Detailed age groups and the sex groups often do not add to the totals shown because of rounding problems. Totals for all diagnostic categories are simply the sum for each column.

Note: The figures for "Infections of the Eye" (consisting of herpes zoster of the eye and viral conjunctivitis) are so thin that group will have to be thrown in with "All Other Eye Diseases." This will be done as a part of the final step.

6. DATA ON DIRECT AND INDIRECT COSTS OF VISUAL DISORDERS

6.1 Evaluation of Existing Data

With the single exception of the series of estimates produced by the Office of Research and Statistics, Social Security Administration, there is no regular "source" of statistics on costs. One has to look to the individual efforts of various researchers in special studies. As we have reported earlier, the efforts to construct estimates for visual disorders and disabilities, or for blindness alone, are few and far between, and lack comprehensiveness and adequate documentation.

Fortunately, the SSA series have resulted in a much improved methodology for estimating costs of disease, and we have borrowed heavily on these methods in preparing the estimates for this study. The methods rely entirely on putting together figures from a variety of sources. No new data are collected for this specific purpose.

The estimates made by SSA have not focused specifically on eye diseases and resulting disability. In the pioneering study by Dorothy Rice (Rice, Dorothy P.: "Estimating the Cost of Illness," Health Economics Series No. 6, Public Health Services, DHEW, May 1966) estimates are provided of the national health expenditures for selected categories of diseases. For "diseases of the nervous system and sense organs" there is an estimate of $1,416.4 million, which covers hospital and nursing home care, and physicians' and nursing services (Table 2). This estimate is for 1963. Morbidity losses for the same group of diseases in that year are put at $1,525.5 million (Table 16) and mortality losses at $299.8 million (Table 5).

000104

The methods developed by Dorothy Rice and her colleagues have not been used before for the visual disorders alone, so in this respect this study represents a first.

In appraising the data available for making estimates of cost, much of what has already been said about the statistics on prevalence and on medical care for visual disorders still applies, since these are heavily relied upon. For lost productivity due to eye diseases the Health Interview Survey is the sole source. Temporary disability is measured in terms of "days lost from work" and permanent disability in terms of "limitation of activity." The statistics on volume of services (visits to physicians, days in the hospital and days of nursing home care) come from the NCHS surveys already discussed, except that the visit statistics were supplemented by the use of NDTI data for missing categories. Statistics on some kinds of services are lacking, as we shall point out in discussing the estimates.

Along with figures on lost productivity and volume of services, one needs data on the unit costs of a day of lost productivity and a unit of service. The former are fairly readily available in statistics from Census surveys, though a number of hotly debated issues arise when efforts are made to put a price on the services of housewives.

The study staff was surprised to find how difficult it was to secure nationally representative data on the prices of particular services related to eye care. What is the average cost of a first visit to an ophthalmologist? Many hours were devoted to seeking a reasonable answer to that question. What is the average cost of the major eye operations? Again, the data are scarce and hard to come by.

Nevertheless, despite missing data and the lack of previous efforts relating specifically to eye disorders and disabilities, we believe the figures produced for this report will serve NEI's purposes adequately. The data sources and methods will be more completely described, the shortcomings acknowledged, and the result will be more comprehensive than anything done before.

It is perhaps also true that the degree of reliability required for estimates of this sort is lower than is needed, for example, in an estimate of the prevalence of blindness due to glaucoma. Certainly, SSA claims no high degree of precision in figures published by the ORS, which have nevertheless proven exceedingly useful.

In order to permit the better estimation of the cost of eye diseases and injuries (and for that matter, of any other disease category) more detailed and nationally-representative statistics on the prices of health care services are needed. The Consumer Price Index data are, in the opinion of the study staff, inadequate for a study of this sort.

000106

6.2 Presentation and Comments on Data Estimates of Direct and Indirect Costs of Eye Disorders and Disabilities

The statistics on economic costs are organized following the model established by Dorothy P. Rice in "Estimating the Cost of Illness," (see Section 6.1 for complete reference). There are certain gaps in the data which have already been alluded to and which should be kept in mind. It is particularly important to remember that the value of taxes and transfer payments should not be added to the direct and indirect costs as estimated in Tables 12-18, since this would result in double counting of dollars.

These methods have been improved upon in more recent work by Cooper and Rice particularly with respect to assumptions about the value of a housewife's services.[1] We have also adopted these changes.

A number of the figures are subject to a good deal of uncertainty because of assumptions that have been made. These are covered in Section 6.3. Information provided in this section should not be separated from the tables since the user should be aware of the limitations of the data.

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[1] See Cooper, Barbara S. and Rice, Dorothy P.: "The Economic Cost of Illness Revisited", (To be published February 1976 - Social Security Bulletin).

000107

The data shown in Table 11 on taxes and transfer payments are known to be incomplete, but this was considered to be of secondary importance because the emphasis was on attempting to cover the direct and indirect costs. Two examples may be cited:

1. It is known that a number of States and local areas provide exemptions of one kind or another to persons who are blind. There was no central repository of such information, so no effort was made to ascertain the amount of state and local tax revenue lost because of blindness.

2. No effort has been made to aggregate the total expenditures of state and local governments and private voluntary groups in services to the blind. We were given an estimate made by the National Accreditation Council based on figures supplied by accredited programs supplemented by an estimate for the remaining programs. The estimate, which was $390 million, is considered to be quite rough. It overlaps some of the money included in Table 18.

Not all of the steps of estimation of indirect costs are shown in Tables 18A-D since they are quite voluminous. Some of these steps are covered in Section 6.3 and the intermediate tables are included in the study files.

000108

Table 11. Summary of Estimates of the Economic Costs of Visual Disorders and Disabilities: United States, 1972 1/

Category of Expenditures or Loss	Expenditures or Losses (in millions of dollars)
Direct Costs	
Visits to Ophthalmologists 2/	$ 352.5
Visits to Other M.D.'s 2/	50.1
Eye Surgery 3/	273.7
Optometrists' Services and Materials	1,196.7
In-patient Hospital Care	336.8
Nursing Home Care	829.3
Ophthalmic Drugs and Optical Goods 4/	564.6
Total	$3,603.7
Indirect Costs (Loss of Earnings)	
Days Lost from Work (acute episodes)	$ 105.4
Persons Unable to Work	775.9
Women Unable to Keep House	184.7
Institutionalized Persons	419.2
Total	$1,485.2
Selected Transfer Payments	
Loss of Federal Income Taxes from Blindness Exemptions -- 1972	$ 15.0
Training of Teachers for Visually Handicapped (U.S. Office of Education) -- FY 1972	1.8
Rehabilitation of Blind and Visually Handicapped (Rehab. Serv. Admin.) -- FY 1974	51.1
National Center for Deaf and Blind Youths (RSA)	.6
Supplemental Security Income for the Blind (SSA) -- FY 1974	127.1
Aids for Blind Veterans (VA) -- FY 1974	1.7
Compensation and Pension for Blind and Visually Impaired Veterans (VA) -- FY 1974	155.0
Rehabilitation of Blind Veterans (VA) -- FY 1974	6.1

1/ For source, see detailed tables.
2/ These expenditures were estimated for 1973 instead of 1972.
3/ This estimate is for 1974.
4/ Sale of optical goods, which is the bulk of this category, includes any fees paid to opticians. See Table 16, footnote 3.

000109

Table 12. Expenditures for Physicians' Services for Eye Care: United States, 1973[1]

Reason for visit (Diagnosis)	Total Visits	Total Cost	Ophthalmologists							
			No. of 1st Visits	Cost per Visit	Total Cost of 1st Visits	No. of Other Visits	Cost per Visit	Total Cost of Other Visits	Total Visits	Total Cost of Visits to Ophthalmologists
Refractive errors	9,175,000	143,630,820	4,017,000	$22.73	91,306,410	4,550,000	$10.33	47,001,500	8,567,000	138,307,910
All other eye diseases and symptoms	16,250,000	189,166,190	2,220,000	$22.73	50,460,600	10,279,000	$10.33	106,182,070	12,499,660	156,642,670
Eye injuries	2,460,000	30,392,510	498,000	$22.73	11,319,540	858,000	$10.33	8,863,140	1,356,000	20,182,680
Eye examinations & medical or surgical aftercare	3,270,000	39,468,030	502,000	$22.73	11,410,460	2,516,000	$10.33	25,990,280	3,018,000	37,400,740
TOTAL	31,155,000	402,657,550	7,237,000		164,497,010	18,203,000		188,036,990	25,440,000	352,534,000

0001110

Table 12. Expenditures for Physicians' Services for Eye Care: United States, 1973[1] (Continued)

Reason for visit (Diagnosis)	Other M.D.'s						Total Visits	Total Cost of Visits to Other M.D.'s
	No. of 1st Visits	Cost per Visit	Total Cost of 1st Visits	No. of Other Visits	Cost per Visit	Total Cost of Other Visits		
Refractive errors	231,000	$10.77	2,487,870	377,000	$7.52	2,835,040	608,000	5,322,910
All other eye diseases and symptoms	1,328,000	$10.77	14,302,560	2,423,000	$7.52	18,220,960	3,751,000	32,523,520
Eye injuries	587,000	$10.77	6,321,990	517,000	$7.52	3,887,840	1,104,000	10,209,830
Eye examinations & medical or surgical aftercare	53,000	$10.77	570,810	199,000	$7.52	1,496,480	252,000	2,067,290
TOTAL	2,199,000		23,683,230	3,516,000		26,440,320	5,715,000	50,123,550

[1]For source of statistics on physicians visits, see Table 5. The proportions of all visits that were to ophthalmologists and other physicians were based on all-visit statistics from NDTI. The average fees for ophthalmologists were taken from a special study by the Bureau of Labor Statistics updated to 1973 using the Consumer Price Index. Other data on fees are from "Profile of Medical Practice, '74" published by the American Medical Association.

0001111

Table 13. Selected List of Eye Operations with Estimated Annual Frequency, National Average Charges, and Total Expenditures: United States, 1974. 1/

Procedure Name	Nat'l Av. Charge	Est. Frequency	Total Expenditure (in thousand
Enucleation of eyeball	$352	9,000	$ 3,168
Pterygium	169	8,000	1,352
Keratoplasty	1000	4,000	4,000
Iridectomy	430	13,000	5,590
Extraction of lens, all types, unilateral	559	333,000	186,147
Reattachment of retina, exclusive of light coagulation of retinal breaks	820	24,000	19,680
Eye muscle operation, any type, in single stage	379	61,000	23,119
Blepharotomy, incision or excision	50	21,000	1,050
Blepharoptosis repair, unilateral	576	6,000	3,456
Excision of conjunctival lesion; cyst	37	4,000	148
Dacryocyctorhinostomy	503	4,000	2,012
Lacrimal Tract dilation, probing and/or irrigation conaliculus, lacrimonasal duct	19	6,000	114
All other operations for which data seemed reasonably good	varied	18,000	5,698
Total		511,000	$255,534
Operations for which some guesswork regarding charge was necessary	varied	64,000	$ 18,120
Grand Total		575,000	273,654

1/ The operations shown here were selected on the basis of frequency. The more detailed background data, including assumptions made, are available in the study files. The terminology for the procedures is an abbreviated version of that used in the California Relative Value Study. Source material for the National Average Charges was information collected by the Health Insurance of America (HIAA). Estimated frequencies are based on PAS-IMS data. See text for details.

000112

Table 14. Expenditures for Optometrists' Services and Materials 1/: United States, 1972 2/

Age	Total Population			Males			Females		
	No. of Visits	Cost per Visit	Total Cost	No. of Visits	Cost per Visit	Total Cost	No. of Visits	Cost per Visit	Total Cost
	(000)			(000)			(000)		
16 years & under	5,797	45.31	$ 252,552,070	2,646	45.31	$119,890,260	3,151	45.31	$142,771,810
17-64 years	17,420	46.51	810,204,200	7,303	46.51	339,662,530	10,117	46.51	470,541,670
65 years & over	2,663	46.51	123,856,130	997	46.51	46,370,470	1,666	46.51	77,485,660
TOTAL	25,880		1,196,722,400	10,946		505,923,260	14,934		690,799,140

1/ Each visit may consist of an examination, prescription, and dispensing of eyeglasses.

2/ Statistics on optometrists visits were obtained from Health Interview Survey rates for FY 1964 projected on 1972 populations by age and sex. Cost-per-visit data are from a special study by the Bureau of Labor Statistics updated to 1972 using the Consumer Price Index.

000113

Table 15. Expenditures for In-patient Hospital Days for Eye Care: United States, 1972[1]

	Days of In-Patient Care	Expense per In-Patient Day	Total Expenditures
Diseases of the Eye	2,973,000	$105.21	$312,789,330
Eye Injuries	228,000	$105.21	23,987,880
Total	3,201,000		$336,777,210

[1]For source of statistics on hospital days, see Table 8. The figure on expense per in-patient day is from Hospital Statistics, 1975 Ed., published by the American Hospital Association.

000114

Table 16. Expenditures for Nursing Home Days for Eye Care: United States, 1972

NURSING HOME CARE 1/	50,443,000 days
COST PER DAY 2/	$16.44
TOTAL COST	$829,282,920

1/ Based on an estimate of 138,201 persons confined to nursing homes as a result of eye problems. This was multiplied by 365 to provide an estimate of nursing home days. Data are from the 1973-74 Nursing Home Survey. See Section 5.3 for details.

2/ This cost per day is based on an average charge of about $500 per month or $6,000 per year.

000115

Table 17. Expenditures for Ophthalmic Drugs and Optical Goods: United States, 1972[1]

All Ophthalmics [2]	$ 47,460,000
Miotics (.6120)	29,045,520
Mydriatics (.0934)	4,432,764
Ophthalmic Decongestant (.1309)	6,212,514
Other (.1637)	7,769,202
Sales of Optical Goods [3]	517,171,000
Total	$564,631,000

[1]Drug expenditures based on Social Security Administration National Health Expenditure series for 1972 subdivided to show ophthalmic drugs using wholesale dollar values from National Prescription Audit data for 1968. Optical goods expenditures based on sales data from 1972 Census of Retail Trade.

[2]Method of estimation is set forth in Section 6.3.

[3]This represents 98 percent of all sales made in optical goods stores. These are establishments primarily engaged in the retail sale of eyeglasses and related optical goods. Establishments whose receipts are primarily from eye examinations and prescription of glasses or contact lenses are excluded. Data are from the 1972 Census of Retail Trade. RC 72-L, p. 20.

Table 18A. Cost of Days Lost from Work by U.S. Population, Males and Females and Injuries to the Eyes in 1972[1]

Males:

Age Group	Number of employed /[2]	Rate of days lost per 100 currently employed	Estimated Days lost from work 1972	Estimated Man Years Lost 1972	Mean Annual Earnings	Total Loss of Earning
Under 35	21,985,000	3.0	659,550	2,692	$ 9,460	$25,466,320
35-44	10,043,000	3.0	301,290	1,230	14,305	17,595,150
45-54	10,149,000	3.8	385,662	1,574	14,136	22,250,064
55-64	6,912,000	3.8	262,656	1,072	12,872	13,798,784
65 and Over	1,949,000	3.8	74,062	302	9,062	2,736,724
Total	51,038,000	-	1,683,220	6,870	-	$81,847,042
			Females:			
Under 35	14,202,000	2.5	355,050	1,449	$ 6,213	$ 9,002,637
35-44	5,728,000	2.5	143,200	584	7,317	4,273,128
45-54	6,311,000	3.1	195,641	799	7,344	5,867,856
55-64	4,083,000	3.1	126,573	517	7,077	3,658,809
65 and Over	1,047,000	3.1	32,457	132	5,456	720,192
Total	-	-	-	3,481	-	$23,522,622

[1]Based on prevalence figures from the Health Interview Survey and the 1973-74 Nursing Home Survey and days-lost-from-work statistics from the Health Interview Survey, and employment figures from the Current Population Survey reports of the Bureau of Labor Statistics. Mean earnings figures were unpublished data supplied by the Office of Research and Statistics, Social Security Administration.

[2]Manpower Report of the President, Table A-14, "Employed Persons 16 years and Over, by Sex, Color, and Age: Annual Average, 1972," U.S. Government Printing Office, Washington, D.C., April, 1975.

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Table 18B. Loss of Earnings for Total U.S. Population Unable to Work Due to Visual Disorders by Degree of Limitation in 1972[1]

Age Group	Unable to Work at All				Limited to Part-time Work				Total-Limited or Unable to Work			
	Population	Number Who Would Have Been Employed[2]	Mean Earnings	Total Lost Earnings	Population	Number Who Would Have Been Employed Fulltime	Mean Earnings	Total Lost Earnings	Population	Number Who Would Have Been Employed	Mean Earnings	Total Lost Earnings
MALES												
Under 65	36,000	18,696	$10,027	$187,476,486	93,000	50,095	$4,834	$242,153,750	129,000	68,791	$6,245	$429,630,236
Over 65	75,000	18,698	9,062	169,441,276	29,000	7,229	4,531	32,754,599	104,000	25,927	7,799	202,195,875
Total	111,000	37,394	$ 9,545	$356,917,762	122,000	57,324	$4,796	$274,908,349	233,000	94,718	$6,671	$631,826,111
FEMALES												
Under 65	16,000	6,489	$ 6,780	$ 43,992,463	43,000	17,442	$3,390	$ 59,128,399	59,000	23,931	$4,309	$103,120,862
Over 65	48,000	4,806	5,456	26,221,536	54,000	5,406	2,728	14,747,568	102,000	10,212	4,012	40,969,104
Total	64,000	11,295	$ 6,216	$ 70,213,999	97,000	22,848	$3,233	$ 73,875,967	161,000	34,143	$4,220	$144,089,966
ALL PERSONS												
Under 65	52,000	25,185	$ 9,191	$231,468,949	136,000	67,537	$4,461	$301,282,149	188,000	92,722	$5,746	$532,751,098
Over 65	123,000	23,504	8,325	195,662,812	83,000	12,635	3,760	47,502,167	206,000	36,139	6,729	243,164,979
Total	175,000	48,689	$ 8,773	$427,131,761	219,000	80,172	$4,350	$348,784,316	394,000	128,861	$6,021	$775,916,077

[1] Based on prevalence figures from the Health Interview Survey and the 1973-74 Nursing Home Survey and days-lost-from-work statistics from the Health Interview Survey, and employment figures from the Current Population Survey reports of the Bureau of Labor Statistics. Mean earnings figures were unpublished data supplied by the Office of Research and Statistics, Social Security Administration.

[2] Derived from U.S. Department of Commerce, Bureau of the Census: Detailed Characteristics - U.S. 1970 Census Population, Table 215, "Employment Status by Race, Sex, and Age," PC(1)D1 summary, U.S. Government Printing Office, Washington, D.C., February, 1973.

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Table 18C. Loss of Economic Value for U. S. Female Population Unable to Keep House Due to Visual Disorders in 1972. 1/

Age Group	Unable to Keep House					Limited to Part--Time Housekeeping					Total - Limited or Unable to Keep House				
	Population	Number Who Would Not Have Been Employed	Number Who Would Have Kept House	Aver. Econ. Value 2	Total Lost Economic Value	Population	Number Who Would Not Have Been Employed	Number Who Would Have Kept House	Aver. Econ. Value 2	Total Lost Economic Value	Population	Number Who Would Not Have Been Employed	Number Who Would Have Kept House	Aver. Econ. Value 2	Total Lost Economic Value
Under 65	16,000	9,511	7,903	$5,482	$43,325,204	43,000	25,558	21,228	$2,742	$58,212,432	59,000	35,069	29,131	$3,486	$101,537,636
Over 65	48,000	43,194	36,417	1,461	53,205,237	54,000	48,594	40,970	730	29,908,100	102,000	91,788	77,387	1,074	83,113,337
Total	64,000	52,705	44,320	$2,178	$96,530,441	97,000	74,152	62,198	$1,417	$88,120,532	161,000	126,857	106,518	$1,734	$184,650,973

1/ Based on prevalence figures from the Health Interview Survey and the 1973-74 Nursing Home Survey and days-lost-from-work statistics from the Health Interview Survey, and employment figures from the Current Population Survey reports of the Bureau of Labor Statistics. Mean earnings figures were unpublished data supplied by the Office of Research and Statistics, Social Security Administration.

2/ U. S. Department of Health, Education, and Welfare, Social Security Administration, Office of Research and Statistics: Research and Statistics Note, note 9, DHEW publication no. (SSA) 75-11701, U. S. Government Printing Office, Washington, D.C., August 1975.

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Table 18D. Loss of Earnings by U.S. Population Institutionalized Due to Visual Disorders in 1972[1]

	Population		Number Who Would Have Been Employed				Loss of Earnings — Those Who Would Have Been Employed					Females Who Would Have Been Housewives			Loss of Earnings — Females Who Would Have Been Housewives	
			Male		Female		Male		Female		Total Population					
Age Group	Males	Females	Proportion Employed	#	Proportion Employed	#	Mean Earnings	Total Loss	Mean Earnings	Total Loss	All Total Loss	Proportion Not In Labor Force Due To Home Responsibilities	# Not In Labor Force	# Not In Labor Force Due to Home Responsibilities	Mean Earnings	Total Loss
Under 35	5,559	4,066	.7115	3,955	.3940	1,602	9,460	37,414,300	6,213	9,953,226	47,367,526	.7995	2,464	1,970	6,118	12,052,460
35-44	1,339	1,061	.9057	1,213	.4584	486	14,305	17,351,965	7,317	3,556,062	20,908,027	.8885	575	511	5,900	3,014,900
45-54	3,125	2,476	.8878	2,774	.4970	1,231	14,136	39,213,264	7,344	9,040,464	48,253,728	.8599	1,245	1,071	5,222	5,592,762
55-64	4,465	3,537	.7955	3,552	.4305	1,523	12,872	5,409,696	7,077	10,778,271	16,187,967	.8568	2,014	1,726	3,268	5,640,568
65 and over	35,867	86,077	.3244	11,635	.1339	11,526	9,062	105,436,370	5,456	62,885,856	168,322,226	.8431	74,551	62,854	1,461	91,829,694
Total	50,355	97,217		23,129		16,368		204,825,595		96,213,879	301,039,474		80,849	68,132		118,130,384

[1]Based on prevalence figures from the Health Interview Survey and the 1973-74 Nursing Home Survey and days-lost-from-work statistics from the Health Interview Survey, and employment figures from the Current Population Survey reports of the Bureau of Labor Statistics. Mean earnings figures were unpublished data supplied by the Office of Research and Statistics, Social Security Administration. For women who would have been keeping house "Earnings" means loss of economic value.

000120

6.3 Methodological Documentation of Data on Direct and Indirect Costs of Visual Disorders and Disabilities

6.3.1 Direct Costs

The general strategy for making estimates for direct costs was to start with statistics on volume of services that had been put together for purposes of the section on Estimates of Medical Care Services Used in Eye Care or which were obtained specifically for the purpose of making the cost estimates. These estimates were then multiplied by estimates of the average charge for each service whether paid for directly by the consumer or through some third-party mechanism.

In the case of physicians' services the statistics had already been brought together for the Medical Care Services section, but it was necessary to break the figures down at least into first visits and subsequent visits and between ophthalmologists and other physicians because the charges differ markedly for those four sub-categories. The distribution of the visits within each of four broad reason-for-visit categories as between opthalmologist-first visits, opthalmologist-other visits, other physician-first visits, and other physician-other visits was carried out based on percentages computed from the NDTI estimates.

The average charge figures for ophthalmologists were a problem. We finally found a statistic for first visits in a special study conducted by BLS in the fall of 1971. This was updated to 1973 using CPI averages for physician's fees. For the subsequent visits to ophthalmologists a figure for subsequent visits to surgeons was used (because ophthalmology is considered one of the surgical specialties). This was obtained from Profile of Medical Practice, '74, published by the American Medical Association. For other M.D.'s the fees were assumed to be the same as for General Practice and were also found in the A.M.A. report.

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The source material used for the frequency of various eye operations was the same as used in the table in the Section on Hospitalization and Ambulatory Care, namely, national estimates for 1974 based on data from the PAS abstracting system, prepared by IMS America, LTD. These were classified by type of operation using the H-ICDA classification.

The source material for the national average charges was information collected by the Health Insurance Association of America (HIAA) for 1974 and supplied for the purposes of this study (with HIAA's permission) by the Institute of Medicine, National Academy of Sciences. These were classified by type of operation by the procedure code used in the 1960 edition of the California Relative Value Study.

The two classifications are entirely different, and it required detailed study to match the categories. It was possible, however, to match the categories with a good deal of confidence for 511,000 of the total of 575,000 operations which were performed in 1974, according to PAS. (This was principally assisted by the fact that 333,000 of these operations were various types of cataract operation for which the national average charge was $559, and another 61,000 were eye muscle operations for which the national average charge was $379.)

These 511,000 operations when multiplied, category by category, by the appropriate national average charge added up to $255,534,000 in charges.

For the remaining 64,000 operations a certain amount of guesswork was necessary. A good many of them fell into residual categories, such as "eyelid repair and plastic operations not elsewhere classified" of which there were 16,000. The guessing was based on the charges for other operations on the same organ of the eye and upon whether the operation involved "plastic" work

(considered most expensive), excision or incision (moderately expensive), or puncture, drainage, probing, etc. (considered less expensive). These remaining operations were dealt with in 13 subcategories for which informed guesses as to average charge had to be made. In aggregate these 64,000 operations were valued at $18,120,000. Since this amount is only about 7 percent of the grand total of $273,654,000 it is not believed that errors in the guessing would affect the total greatly.

The record of the computation is rather lengthy and will not be included here but will be available in the files of the study.

For optometrists' services the volume statistics were taken from Vital and Health Statistics Series 10, No. 28. These data (which were the most recent we could find) related to FY 1964. They were updated to 1972 by projecting the rates by age and sex onto 1972 population figures.

Optometrists' charges for adults are the usual fee for examination, prescription, and dispensing of eyeglasses as reported in Average Retail Prices of Selected Commodities and Services, Fall 1971, Department of Labor, BLS, 1973, p. 5. The 1971 fee is updated to 1972 by linking into the change in the CPI for examination, prescription, and dispensing of eyeglasses. Charges for children are assumed to be .9742 of adult charges, based on the ratio of the cost of dispensing eyeglasses to children ($29.43) versus the cost to adults ($30.21). These costs come from Average Retail Prices ..., Fall 1971, p. 5, and are costs of a visit to an optician.

	Index	Index	Change
CPI Examination, Prescription, and Dispensing of Eyeglasses	120.3	124.9	.0382

	Actual 1971	Estimated 1972
Optometrists' Charges		
Adult	$44.80	$46.51
Child ($46.51 x .9742)	N.A.	$45.31

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The statistics from the Hospital Discharge Survey for 1972 were the source of the 3,201,000 days of hospital care attributable to diseases and injuries of the eye in Table 15.

Expenses per in-patient day, 1972, come from Hospital Statistics, 1975 Edition, p. 4, American Hospital Association. Expenses per in-patient day are generally assumed to be the same as charges per in-patient day since 93.6 percent of non-federal short-term general and other special hospital beds were in not-for-profit institutions in 1972.

In the case of nursing home care, there was a problem. We had no statistics on the numbers of persons confined to nursing homes because of an eye disease or vision impairment. A large proportion of persons in nursing homes has defective vision, but only a fraction of these are there principally because of the visual problem. We assumed that those classified in the 1973-74 Nursing Home Survey as having severely impaired vision were there principally because of that problem. There were an estimated 138,201 such persons in the Survey. An equal number on every day of 1972 would result in 50,443,000 days of nursing home care.

The average charge was computed from other data from that same Survey. The median charge for "glaucoma or cataract" cases was $466 per month. The average charge (excluding "no charge") was about $504. We used a figure of $500 per month, or $6,000 per year, equivalent to $16.44 per day.

000124

Estimating the cost of prescription drugs for eye care was carried out in the following steps:

Wholesale Dollar Value of all prescriptions filled in 1968:

2,039,448,000

Wholesale Dollar Value of all ophthalmic prescriptions filled in 1968:

11,416,000

Ratio = .0056

1968 Wholesale Dollar Value Distribution between types of ophthalmics

	$	%
all Ophthalmics	11,416,000	100.00
Miotics	6,987,000	61.20
Mydriatics	1,066,000	9.34
Ophthalmic Decongestant	1,494,000	13.09
Other	1,869,000	16.37

1972 Total Drug & Sundries Expenditures - $8,475,000,000

1972 Expenditures for Ophthalmics

$8,475,000,000 x .0056 = $47,460,000

All Ophthalmics	$47,460,000
Miotics (.6120)	$29,045,520
Mydriatics (.0934)	$ 4,432,764
Ophthalmic Decongestant (.1309)	$ 6,212,514
Other (.1637)	$ 7,769,202

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The sources for the above figures are:

> Wholesale dollar value of ophthalmic prescriptions and all prescriptions in 1968: 1968 National Prescription Audit, Therapeutic Category Report, General Summary. Report supplied by NIH. (Later figures from NPA were available but would have cost a considerable amount of money. Since 1968 data were available at no additional cost, having been secured for another purpose, it was decided that the slight improvement in accuracy was not worth the additional sum. Drug expenditures represent only 1.3 percent of all direct costs.)
>
> Retail expenditures for drugs in 1972: 1974 Statistical Abstract, Table 100, National Health Expenditures by Object: 1950 to 1972.

Table 17 also includes a figure for sales of optical goods. The source of this figure is given in the footnote to the table.

6.3.2 Indirect Costs -- Institutional Population

The data for the institutional population come from estimates of the numbers of persons confined to institutions with severe visual impairment. These were made in the course of preparing the prevalence estimates (q.v.). It was again assumed that those with severe visual impairment were confined because of the eye problem. These population data were then reduced to reflect the number of males and females in the appropriate age categories who would have been employed if they were not institutionalized. The same procedure is followed for females who would have been keeping house. These figures come from the following sources:

For the population that would have been employed, we have used unpublished data provided by the Bureau of Census.

For the females who would have been keeping house we have used figures from Table A-28, Labor Force Status of Civilian Non-Institutionalized Population by Age, Sex and Reasons for Non-Participation. This comes from the Special Labor Force Report No. 142 published by the Department of Labor, Bureau of Labor Statistics.

Once the numbers of individuals in each of the three categories, that is, males and females who would have been employed and females who would have been housewives are determined, they are then multiplied by mean earnings for those who would have been employed or loss of economic value for

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housewives. The mean earnings figures are derived from unpublished data presented to us by the Social Security Administration. The loss of economic value for housewives comes from the Research and Statistics Note No. 9-1975 published by the Office of Research and Statistics, Social Security Administration. The concept of who would have been employed is a part of two factors. First we take by age group the labor force participation rate for each age group, for each sex, and this then gives us a total number of people who would have been in the labor force. This figure is then adjusted by a factor to give us those who would have been employed assuming that the unemployment rate was at the so-called full employment level. Full employment is defined to mean 5% unemployed. Without the assumption of full employment, losses due to disability cannot be isolated from losses due to unemployment.

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6.3.3 Indirect Costs -- Non-Institutionalized Population

Currently Employed. For the currently employed, we have estimated the cost of days lost from work due to visual disorders and injuries to the eyes in 1972. The basic procedure for this was, first of all, to determine the number of males and females employed by age group. This came from Table A-14, "Employed persons 16 years of and Over by Sex, Color and Age Annual Average 1972" published in Manpower Report of the President, April 1975. The number of employed was then multiplied by the rate of days lost per 100 individuals currently employed. These rates came from Health Interview Survey data supplied to us by NCHS, which are averages for the years 1970-73. We thus have estimated days lost from work, 1972. These figures are converted into estimated man-years lost by dividing the days lost by 245 (the number of working days in a man-year). The man-year figures are then multiplied by the mean annual earnings for each of the appropriate age categories. The aggregate of these is an estimate of total lost earnings among the currently employed resulting from diseases and injuries of the eyes.

Persons Unable to Work. The population figures for use in this category come from special tables supplied to us by NCHS on persons with activity limitations resulting from impairment of vision. Most of the estimates were for 1972, but some were for 1971. The latter figures were assumed to have remained unchanged in 1972.

The population is then multiplied by the percent of people in each age category who are employed, thus giving us an estimate of the number of the disabled who would have been employed. The numbers who would have been employed are then

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multiplied by the mean earnings for each age and sex category to yield a figure called total lost earnings. The basic procedure is repeated four times: first, for males unable to work due to vision; second, for females unable to work due to vision; then for males limited in the amount or kind of work due to vision and finally, for females limited in the amount or kind of work due to vision. The mean earnings loss figure used for males and females who are limited to part time work was taken to be half that of the mean earnings loss for males and females who are unable to work at all. The assumption being made, perhaps erroneously, is that these individuals are limited to approximately half-time work. There is no backing for this position and we could have just as easily used 25 percent or 75 percent.

The last non-institutionalized group is women keeping house. The population for this group derives from the same set of tables referred to above and is the same as that population reported for females who are unable to work. The actual number who would have kept house is determined, first of all, by taking the total population in each of the age groups, subtracting out of it the number who would have been employed as calculated in the persons-unable-to-work computations. This gives us a number for those who would not have been employed. This then is adjusted by a figure for the percent of those who would not be employed due to housekeeping responsibilities. This figure comes from Table A-28, Labor Force Status of Civilian Non-Institutionalized Population by Age, Sex and Reasons for Non-Participation, Special Labor Force Report No. 142, published by the Department of Labor, Bureau of Labor Statistics in 1972. This yields an estimate of those who would have kept house had they not been restricted in activity. This number is then multiplied by the average economic value of a housewife in a particular age group. These average economic value figures come from Research

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and Statistics Note No. 9-1975. This then provides a figure called "total loss of economic value." This is assumed to be the same as total loss of earnings.

The intermediate tables for these computations are quite voluminous and are not included in this section. They will be available in the study files.

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6.3.4 Transfer Payments and Taxes

The figures presented in Table 11 on transfer payments and taxes related to vision impairment and blindness are discussed in Section 6.2 and need not be further documented here.

6.3.5 Mortality Losses

It has been the practice in estimating the indirect costs of illness to include estimates of the present value of expected future lifetime earnings for those dying from the disease in the year for which estimates are made. This step has been omitted here because the eye diseases are not a significant cause of death. The number of deaths allocated to eye diseases as an underlying cause in all the ICDA categories considered in this report totaled 452 in 1972. The bulk of these (360) were malignant tumors of the eye. The deaths from injuries to the eye are not separately classified.

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7. SUMMARY OF DATA ON VISUAL DISORDERS BY DIAGNOSTIC CATEGORY

7.1 Introduction

In this chapter we shall attempt to summarize the principal data we have been able to assemble regarding the diseases and injuries listed in Article I of the Description of Work of Part II of the Proposed Contract Provisions. Not all of the categories mentioned there will be covered. The omissions are for one or both of two reasons: (1) disease classifications were not designed to permit abstracting data for the category mentioned; or (2) sample sizes were too small to allow an estimate for that category to be made.

We are aware that it would be very useful to include in this discussion of specific eye diseases estimates of the cost of these diseases that would be consistent with the overall estimates for eye diseases in Chapter 6. Unfortunately, the nature of the available data makes this impractical. The data on ambulatory care and hospitalization that we were able to gather could probably be used to make estimates for those components, but subdividing costs for surgery, nursing home care, ophthalmic drugs, opticians' sales, and optometrists' services by disease for which the cost was incurred would be mostly guesswork. The indirect costs, too, would present problems and involve assumptions that would be hard to justify. For these reasons we have decided to omit discussion of costs in this chapter.

If it is not mentioned specifically in the stub of the table, we shall also try to indicate the place in the tables of Chapters 3, 4, and 5 that the particular disease category is included.

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In the text that follows, the initials NDTI refer to the "National Disease and Therapeutic Index" survey operated by IMS America, LTD., and PAS refers to the Professional Activities Study national estimates prepared by IMS America, LTD.

7.2 Major Diseases of the Eye

7.2.1 Glaucoma

Based upon statistics of first visits to physicians (exclusive of referrals) there appear to be about 178,000 new cases of glaucoma each year. The incidence among females is considerably higher, and the new cases were first diagnosed predominantly at ages 45 years and over.

The estimated prevalence of impaired vision resulting from glaucoma is approximately 1,070,000. Of these, 207,000 had vision that was severely impaired and about 56,000, mainly at ages 65 and over, were considered legally blind as a result of this disease.

There are nearly 2 million visits to physicians each year for diagnosis and care of glaucoma and an estimated 25,400 hospital stays in which glaucoma was the principal diagnosis.[1]

The figures above exclude congenital glaucoma which is classified under congenital anomalies in the ICDA. This form of glaucoma must be quite rare, however, since the estimated

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[1]This figure excludes stays in federal hospitals. Inclusion of Veterans Administration hospitals, the largest category of federal hospitals, would add 1450 additional stays (5.7%).

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average number of visits per year, based on NDTI data, is less than 20,000 and the number of these that were first visits was too small to be estimated. There were about 1,000 cases discharged from hospitals in 1974.

Regarding the various types of glaucoma, it can only be said that the visits to physicians reported to NDTI were subdivided as follows:

	All visits	First visits without referrals
Total	100.0%	100.0%
Chronic glaucoma	32.8	20.9
Primary glaucoma	0.4	0.6
Secondary glaucoma	3.4	4.2
Acute glaucoma	3.6	6.6
Unspecified glaucoma	59.8	67.7

In other words, the bulk of the glaucoma is unspecified as to type in the records of medical care.

The hospitalizations for glaucoma were most frequently classified as "primary acute" (about 40 percent) and "primary chronic" (about 25 percent).

7.2.2 Cataract

In the classification of cataract the usual practice is to exclude diabetic cataract and congenital cataract, assigning those types to diabetes and congenital diseases respectively. With that point noted, the incidence of cataract in recent years is estimated to average 912,000 new cases per year based on first visits to physicians, exclusive of referrals. About 3/4 of these were first diagnosed at ages 65 and over, and the incidence for women is considerably higher than for men.

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The prevalence of impaired vision cases resulting from cataract is 1,670,000. Of these, 183,000 had vision that was classified as severely impaired, and 48,000 were estimated to be legally blind from cataract. (Note that these prevalence figures are derived from the lines of the tables in Chapter 4 labeled "Cataract - other." "Cataract - prenatal" will be discussed below.)

Visits to physicians for cataract (again, this includes ICDA code 374 only) were estimated at 2,723,000 in the year ending April 30, 1974, and in 1972 there were about 283,000 completed hospital stays.

Surgery is common in the treatment of cataract. There were an estimated 332,000 operations performed in 1972[2] of the following types:

Extraction of lens, extracapsular	14,000
Extraction of lens, intracapsular	305,000
"Extraction of lens" or "Cataract" NOS	13,000

The number of operations appears to exceed the number of hospitalization stays, but it should be remembered that the hospitalization data include only stays assigned to cataract as the principal diagnosis.

The data cited above include "senile cataract," "radiation cataract," and "toxic cataract," as well as cataract resulting from trauma. But there is little evidence based on nationally representative data to indicate the relative frequency of these types. Most cases are labeled "cataract" without other specification in the medical records.

There are some figures available, however, on congenital cataract. As mentioned earlier, these cases are classified under

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[2]Inclusion of stays in Veterans Administration hospitals would add about 8,000 episodes of hospitalization (2.8%) and 8,200 operations (3.2%).

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"congenital eye disorders" in the incidence table. Out of a total of 49,000 first visits to physicians for congenital eye disorders (in the average recent year), about 14,000 were for congenital cataract.

In the prevalence tables there is a separate line for "cataract - prenatal." This is because the diagnostic distribution for those tables was based on the classification used for the Blindness Model Reporting Area in 1970. This classification is described[3] as a "simplified combination of the affection and etiology groupings previously reported." Those, in turn, were developed by the National Society for the Prevention of Blindness.

Hence, we can cite estimates of the prevalence of "prenatal" cataract of 41,000 for all impaired vision, 34,000 for severely impaired vision, and 16,000 legally blind. The great majority of these are classified as "under 65 years," as might be expected, but in all probability by no means all of them were first diagnosed in childhood. Of the total of about 49,000 first visits for all congenital eye disorders in the average year, three-fifths were first seen at age 15 years and over.

The great majority of hospitalizations (67 percent) were labeled "senile cataract" and another large proportion (30 percent) were recorded simply as "cataract" without further specification. The balance were divided about equally among "traumatic," "secondary membrane" and "cataract not elsewhere classified." (These are the subcategories used in the coding of PAS data.)

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[3]See "Statistics on Blindness in the Model Reporting Area, 1969-1970", published by the NEI, p. 3.

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7.2.3 Retinal Disease

In the International Classification, upon which most of the statistics are now based, there are six categories for retinal disease: "detachment of retina" (376); "vascular lesions of the retina" (377.0) which includes retrolental fibroplasia; "degeneration of the retina" (377.1); "amblyopia" (377.2)[4] "color blindness" (377.3); and "other diseases of retina" (377.4). In the previous revision (adopted in 1955), which, with a good deal of additional detail, is still the basis for the NDTI classification, all of the above groups, with the exception of "detachment of retina," were grouped under "other diseases of the eye." Hence, disentangling the statistics for retinal diseases is particularly difficult.

"Retinoblastoma" is grouped with other malignant neoplasms of the eye, as is also "melanoma of the eye." "Diabetic retinopathy" is classified simply as diabetes mellitus. "Retinitis pigmentosa" has a separate category (744.6) among the congenital anomalies of the eye.

In the estimates of incidence shown in Chapter 3, the only estimate shown is for "detachment of retina," 25,000 cases, based on first visits to physicians in the average recent year from the NDTI survey. This is the only estimate that was obtained by age and sex. However, the following other categories

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[4]We note that amblyopia is not included among retinal diseases in the list supplied by NEI for the Description of Work. However, its location in the ICDA seems to imply it is considered to be a retinal disease there.

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of retinal disease are listed in the detailed breakdown of "Other Diseases of the Eye" supplied by NDTI for the purpose of this study:

	Average annual no. of visits to physicians, 1970-1974	
	First Visits without referrals	All visits
Degeneration of macula	165,000	794,000
Thrombosis of retinal vein	23,000	269,000
Retinal vitreous hemorrhage	49,000	322,000
Hematoma orbit vitreous	6,000	19,000
Amblyopia	135,000	478,000

Regarding retinal diseases classified elsewhere (than in the eye disease categories) the following evidence is available from the NDTI survey:

	Average annual no. of visits to physicians, 1970-1974	
	First Visits without referrals	All visits
Retinoblastoma	(too small to estimate)	13,000
Melanoma of eye	not separately classified	
Diabetic retinopathy	39,000	342,000
Diabetes with ocular complic. NOS	7,000	101,000
Retinitis pigmentosa	9,000	35,000

There appeared to be no separate statistics for "retrolental fibroplasia" in the data from NDTI.

As was seen in the prevalence tables in Chapter 4, retinal diseases there are shown in four subgroups: "prenatal," "diabetic," "other," and "retrolental fibroplasia." The "other" group, which apparently includes macular degeneration, is the largest. We suspect that the bulk of these are macular degeneration, especially among those classified as "severe visual impairment" and those considered legally blind. However, we are unable

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to produce statistics on the numbers of persons severely impaired or legally blind specifically as a result of macular degeneration.

The prevalence estimates made for this study are as follows:

	Total with Impaired Vision	Severe Visual Impairment
Retinal disorder - prenatal	76,000	72,000
Retinal disorder - diabetic	138,000	70,000
Retinal disorder - other	601,000	250,000
Retrolental fibroplasia	19,000	19,000

The latest report on the Blindness Model Reporting Area, previously cited, contains a table on first additions to the registers by affection and etiology.[5] The data are limited to cases examined by ophthalmologists or ENT specialists and are for 1969 and 1970. These statistics show that senile retinal degeneration is the largest single category of additions to the registers, accounting for 13 percent of all additions. There are no corresponding figures in the prevalence tables.

The hospitalization statistics are classified using the International Classification, and the estimate for retinal diseases included in the eye disease part of that list is 28,900 cases discharged from hospitals in 1972. The table produced for

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[5]These data represent neither incidence nor prevalence and are considered rather unreliable. Hence, they have not been used elsewhere in this report.

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the study by IMS America, LTD, and based on PAS data permits the following additional detail:

Retinal disease categories included in eye disease section of ICDA	Distribution of discharge cases, principal diagnosis
Detachment of retina	72
Retinal vascular lesion	13
Degeneration of retina	9
Amblyopia	3
Retinal disease, NEC	3
	100 percent

In addition, there were a few (less than 500) hospitalizations for retinitis pigmentosa, but data for neoplasms of the retina and retinal effects of diabetes could not be extracted from the hospitalization statistics.

7.2.4 Refractive Errors

As has been pointed out elsewhere in this report, the concept of incidence, new cases having onset in a specified period of time, is not appropriate to the measurement of morbidity from refractive errors. Hence, morbidity data shown are limited to very rough estimates of the prevalence of impaired vision and somewhat more reliable estimates of severe visual impairment and legal blindness resulting from refractive error. These data suggest that myopia is the only category warranting separate figures (36,000 cases with severe visual impairment in 1972 and 14,000 cases classed as legally blind). The other types of refractive error serious enough to cause blindness were assigned to "other" in the MRA tables and cannot be separately estimated. Nevertheless, judging from the amount of medical care required for their treatment, the refractive errors are a highly prevalent cause of impaired vision less severe than blindness. The prevalence

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tables in Section 4 show total figures of 715,000 for myopia and 1,662,000 for other refractive errors causing some impairment of vision. These figures must be considered as very rough.

When it comes to statistics on ambulatory care, the refractive errors predominate over all other eye afflictions. The overall estimate of physician visits in the year ending April 30, 1974 is 9,175,000, or 29 percent of all visits for eye care. The distribution of these by type of refractive error is as follows:

Type of Refractive Error	Percentage of visits in NDTI Survey, 1970-74
Astigmatism	2.8
Hyperopia	5.6
Myopia	22.1
Presbyopia	13.4
Hyperopic astigmatism	2.6
Emmetropia	12.9
Myopic astigmatism	5.6
Presbyopic hyperopia	4.6
Other mixed refractive error	4.9
Other specified types	3.8
Refractive error, type unspecified	21.8
	100.0

7.2.5 Diseases of Cornea and Sclera

With the exception of "corneal ulcer and opacity," the statistics of incidence we have been able to present in Chapter 3 do not contain separate figures for various diseases of the cornea and sclera. The estimate for that group is given as 104,000 cases first diagnosed in the average year. (These are grouped by us with major chronic conditions though some undoubtedly are better classed as acute illnesses.)

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The classification is, again, somewhat confused since in the earlier edition of the International List, used by NDTI, corneal ulcer and corneal opacity each have separate code numbers that are not in the inflammatory diseases section, while inflammation of the cornea, not specified as infective, is included as one of the inflammatory diseases. In the later edition, used in the NCHS and PAS coding, corneal opacity is separately identified as a non-inflammatory disease while "keratitis with ulceration" is coded as an inflammation.

Neoplasms of the cornea and sclera are not distinguishable from other neoplasms of the eye in either edition of the International List.

Our statistics on incidence follow the NDTI classification. Hence, many new cases of disease of the cornea and sclera are buried in a large category of "inflammations of the eye" for which we estimated the incidence as 1,180,000 cases per year. A few are included in "infective and parasitic diseases of the eye" (only about 4,000 new cases per year in all) and others are among the 200,000 cases of allergic disorders.[6]

In the prevalence figures there is a group labeled simply, "cornea or sclera." This was the title used in the MRA tables, and no further detail is available. Our estimates are: 294,000 for impaired vision, 67,000 for severely impaired vision, and 22,000 for the legally blind.

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[6]We also show an estimate of 446,000 injuries per year due to abrasion of the cornea and eye.

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Some indication of the relative magnitude of the various diseases of the cornea and sclera can be obtained from data on visits to physicians. The figures below are taken from NDTI averages for the years 1970-1974. Since these figures tend to exceed by a factor of about 2 estimates for corresponding categories from the National Ambulatory Care Survey for the year ending April 30, 1974, and since there is no clear answer as to which survey is closer to the truth, it is best to use these estimates as measures of relative frequency only:

	Average annual no. of visits to physicians, 1970-1974	
	First visits without referrals	All visits
Herpes zona ophthalmica	11,000	88,000
Infectious kerato-conjunctivitis	2,000	12,000
Keratitis	136,000	668,000
Corneal ulcer	75,000	436,000
Corneal opacity	30,000	107,000
Open wound of cornea	19,000	104,000
Abrasion of cornea	336,000	941,000

The estimates of hospitalization based on PAS hospitals from the table produced for the study by IMS America, LTD. suggest that about one-fourth of the hospitalizations for corneal disease are for herpes zoster of the eye, another one-fourth for keratitis not specified as involving ulcer, a third for keratitis with ulcer, and about one-eighth for corneal opacity. This excludes injuries to the cornea which cannot be separately shown in the International classification.

7.2.6 Uveitis

It is best to consider uveitis together with choroiditis and iritis since the inflammatory processes in these parts of the eye

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are probably not well distinguished in the statistics. They are all included in the broad grouping of "inflammations of eye" in our incidence estimates. Judging from NDTI statistics on first visits, exclusive of referrals, we would estimate that about 3.5 percent of the inflammatory disease first-visits were for these three types combined. (Sixty-eight percent of the inflammations of the eye were classified to conjunctivitis, and blepharitis and hordeolum (stye) each accounted for about 7 percent of the first visits.)

However, as has been pointed out in discussing other disease categories, the classification system causes us to exclude these inflammations when they result from specified disease processes. Toxoplasmosis, histoplasmosis and sarcoidosis cases involving inflammation of the eye are inextricably merged with other cases of these diseases. Those caused by allergy are submerged in much larger categories of allergic disorders, except that NDTI has created two special subcategories of "other allergic disorders" for use in its own coding. These are:

	First visits	All visits
Allergic conjunctivitis	417,000	1,100,000
Other allergic eye disorders	113,000	286,000

These suggest that eye allergies are responsible for a considerable amount of ambulatory medical care. Our estimate of the incidence is 200,000 new cases a year (with considerably higher incidence among females). But, of course, only a relatively small fraction of that incidence is allergic inflammation of the uveal tract.

Uveitis is a single indivisible category in the estimates of prevalence we have presented. We estimate 285,000 cases with

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impaired vision, 67,000 cases with severely impaired vision and 23,000 persons legally blind with this affection. When first additions to the blindness registers are classified by affection and etiology (see MRA data for 1969-1970), it appears that the etiology of most of the cases was either not reported or reported as undetermined. Uveitis ranked moderately high as a cause of blindness among all persons on the registers. If ranked higher than retrolental fibroplasia, myopia, and congenital cataract, about the same as diabetic retinopathy, and lower than optic nerve disease, ordinary cataract, glaucoma, and macular degeneration.

Iritis and uveitis and other uveal tract inflammations were responsible for somewhat over 3,000 hospital stays in 1974, and other uveal tract diseases accounted for another 3,000.

7.2.7 Optic Nerve Disease

The classification of diseases of the optic nerve is similar to that of categories discussed above. Infectious disease is grouped with the specific infections and not distinguished; the same is true of neoplasms. Inflammations of the optic nerve not due to specific infections are given a code along with inflammation of the retina among the inflammations of the eye. Other diseases of the optic nerve, such as atrophy, are classified with "all other diseases of the eye" in the 7th revision of the International List, but in the 8th revision, they are given two categories, "papilledema" and "other diseases of optic nerve."

The incidence estimates we have presented show none of those groups separately. Again, we have recourse to statistics on visits to physicians for evidence about the relative frequency of some of the optic nerve diseases, with the same caution mentioned

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with respect to diseases of the cornea and sclera above. The data are from the NDTI survey:

	Average annual no. of visits to physicians, 1970-1974	
	First visits without referrals	All visits
Inflammation of the optic nerve and retina	15,000	217,000
Atrophy of optic nerve	18,000	103,000

Although these do not appear to account for large portions of the ambulatory care for eye diseases, optic nerve disease is an important cause of blindness. Only macular degeneration, senile cataract, and glaucoma outrank it as a cause of legal blindness among persons on the registers. Our prevalence estimates are 121,000 for visual impairment, 107,000 for severe visual impairment, and 41,000 for legal blindness.

The optic nerve inflammations and other optic nerve diseases were responsible for approximately 6,000 hospital stays in 1974.

7.2.8 Strabismus

Although strabismus appears to be a disease with relatively high overall morbidity and one that accounts for a great deal of medical care, we lack figures on the extent of disability resulting. We have shown an estimate of 403,000 cases newly seen by physicians each year. We also cite elsewhere an estimate from the Health Examination Survey that of 24 million children in age range 6 - 11 years, 2.2 million were found to have an eye muscle imbalance, a disease condition, or other abnormality in one or both eyes, and that of these 1.6 million had sufficient eye muscle imbalance to be rated as having strabismus.

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However, the MRA classification of causes of blindness understandably does not have a separate classification for strabismus. Hence, we have shown no estimate of prevalence.

The medical care figures demonstrate the importance of this condition in the treatment of eye disorders. In the year ending April 30, 1974, 1,234,000 visits to physicians were ascribed to strabismus, and there were an estimated 74,800 hospitalizations in 1972. Among the hospitalized cases convergent strabismus accounted for 54 percent, divergent strabismus for 32 percent, and "vertical," "cranial nerve palsy," and "strabismus not otherwise specified" for the balance.

Operations related to strabismus, according to PAS, account for about 10 percent of all eye operations.

7.2.9 Certain Other Eye Diseases

The sections above account for most, but not all, of the diseases responsible for significant amounts of medical care. There are many eye diseases that are very rarely seen in medical practice; in fact, the classification of eye diseases and of eye operations are much more detailed than for other body organs, reflecting the complexity of the eye.

Though not separable in the statistics we have shown in Chapters 3, 4, and 5, there are several other diseases that are worthy of special mention.

Blepharitis and hordeolum were responsible for about 700,000 visits to physicians in the year ending April 30, 1974, and conjunctivitis accounted for close to 3,000,000. The former

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were not significant causes of hospitalization, but conjunctivitis was the primary diagnosis in some 3,000 cases in 1974. All of these are included in inflammations of the eye in our incidence and hospitalization tables.

Another large group of inflammations of the eye is the group of lacrimal gland inflammations. These accounted for over 200,000 visits to physicians and 10,000 hospital stays.

Among the non-inflammatory diseases chalazion required somewhat over 400,000 visits and about 5,000 hospitalizations, and pterygium visits numbered in the neighborhood of 300,000 and hospitalizations, 9,000. Other diseases of the eyelid cannot easily be sorted out in the statistics from NDTI because of the method of grouping, but as causes of hospitalization they are of some importance with an estimated 28,000 discharges in 1974.

7.2.10 Neoplasms of the eye

It has been mentioned elsewhere in this report that the Third National Cancer Survey estimated the incidence of primary invasive cancers of the eye at 0.8 per 100,000 population and that this corresponds to about 1600 new cases per year in the total population. The estimate of incidence based on first visits to physicians, which we present in Chapter 3, is 7,000 and the frequency of hospitalizations in Chapter 5 is 4,000 per year. It should be borne in mind that our figures include both benign and malignant cases.

The data on first visits suggest that benign tumors outnumber the malignant by a factor of about 15 to 1. (This ratio is subject to large variability as a result of sampling.)

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On the other hand, the PAS hospitalization data indicate that hospital stays are about equally divided between the benign and malignant cases. Retinoblastomas cannot be separately identified in the hospital statistics we used.

7.2.11 Injuries to the eye

All the evidence points to the importance of injuries as causes of eye morbidity and medical care. The injuries sufficiently serious to cause restricted activity for at least a day or requiring medical attention appear to occur at the rate of just under 2,000,000 a year. Foreign body injuries account for about a half of these.

Visits to physicians have been estimated at 2,460,000 yearly and hospitalizations at 42,700. The figures are much higher for males than for females, and cases of childhood injury are numerous.

Days of hospital care attributed to eye injuries as a primary diagnosis were estimated at approximately 228,000 in 1972.

It is difficult to determine what proportion of the visually impaired and legally blind owe their condition originally to an eye injury. The MRA prevalence tables show no information on this etiology. However, the data on first additions to the registers in 1969 and 1970 were tabulated by etiology, and these suggest that between 3 and 4 percent of these additions were caused by injury or poisoning. Since 17 percent of all additions were "not reported or determined," the actual figure for injuries may be somewhat higher.

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Tabulations from the Health Interview Survey indicate that something over a million days a year are lost from work due to eye injuries. (The figure is subject to a high relative sampling error.) In the 1971 data collection the Health Interview Survey included special questions on impairments, and from the results of that survey we learn that injuries accounted for 5.4 percent of the severe visual impairment in the non-institutional population. (This compares with 36.1 percent for cataract and 7.8 for glaucoma. Here, too, the percentages are underestimated because in 23.6 percent of the cases the etiology was unknown to the respondent.)

8. RECOMMENDATIONS FOR FUTURE STUDY

The implications of our evaluation of existing data in Sections 3-6 and of the shortcomings of the estimates we have been able to produce are many. We shall mention here only a few that seem to us to be particularly important:

a) Some improvements must be made in the methodology for estimating the incidence of chronic diseases such as glaucoma, cataract, and detachment of the retina. When chronic diseases are usually first diagnosed in hospitals or hospitalized shortly after initial diagnosis, the problem is relatively simple, but when the situation is otherwise the collection of data for representative samples of the population becomes expensive and complicated. Such ongoing data collection systems as NDTI and NAMCS provide useful guides, but the first-visit concept needs refinement so that one can be more sure that the first visit represents the first diagnosis of this condition in this patient, not just the first visit of this patient to this physician, for this episode of this condition.

b) The experience and ingenuity of sampling statisticians should be turned to the problem of estimating the prevalence of disease conditions that are rare in the population and that cannot be accurately counted without the use of clinical tests and measurements. This type of application of modern sampling methods is referred to in footnote 2 of Section 4.1.1.

c) Of particular importance is the improvement and standardization of measures of levels of visual functioning. Research is needed to define categories useful in the treatment and rehabilitation of persons with impaired vision. This is not to suggest that the definition of "legal blindness" should be completely abandoned. It

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does seem clear, however, that it is hard to equate this with a person's ability or inability to perform specified tasks necessary to care for himself, to perform housework, move around without help, or earn a living. On the other hand, the scales used in the Health Interview Survey seem too imprecise and subjective.

A study that exemplifies at least the beginnings of the kind of research needed is reported in: Haase, Kenneth W. and Bryant, E. Earl: "Development of a Scale Designed to Measure Functional Distance Vision Loss Using an Interview Technique." *Proceedings of the Social Statistics Section,* American Statistical Association, 1973, pp. 274-279. This is the only research we were able to find that linked a thorough opthalmological examination to responses to questions about ability to perform common tasks. However, the tasks were defined in terms of social functioning, and the clinical results were confined to Snellen chart readings with present correction in the better eye. Both axes should be broadened to cover other characteristics of vision, and the study should be repeated with a larger sample.

d) The International Classification of Disease should be examined with reference to eye disorders so that it permits more complete aggregation of the eye diseases. (For example, allergic disorders of the eye can no longer be identified in the code.) Also, it should be altered in ways that will make it more useful for rehabilitation purposes. Perhaps there should be an optional 5th digit for classifying eye disorders by degree of impairment.

e) Surveys of the institutional population, in which is concentrated some of the most severely disabled persons, should be extended to cover institutions other than nursing homes. It is helpful to know, as we do in the 1973-74 Nursing Home Survey, some facts about the degree of visual and hearing impairment and mobility of the patients, but it would also be extremely helpful in economic studies to know the principal disease or condition that was responsible for the patient's confinement.

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f) The paucity of detailed data about the frequency of specific procedures used in the general and specialized practice of medicine is quite astonishing. Except for surgical operations and other hospital procedures, such data are hard to find. Perhaps NAMCS and NDTI can produce the information needed, but one would think that the claims data from such enormous programs as Medicaid and Supplementary Medical Insurance under Medicare could be better exploited.

g) The same can be said about the prices of specific medical procedures. The Consumer Price Index is completely inadequate for a study of the type reported here. Even representative data on the prices of operations are difficult to find and for the common eye operations, with the exception of cataract operations, one has to concoct estimates by devious means. For non-operative procedures the situation is worse. Again, the big bill-paying programs should be able to produce representative data, but it is difficult to find.

h) The striking differences between national estimates of average annual physician visits in the data from the new NAMCS survey and the NDTI survey should be investigated. The magnitude of these differences (for about 13 eye disease categories that appeared to be comparable) is shown in the Table in Section 5.3. We know some of the reasons for these differences, but the known reasons could not possibly account for ratios averaging 2 to 1. Since both of these sources are and will be widely used, there should be a much better understanding than we now have of why they are in such poor agreement.

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It is clear that only a few of the recommendations listed above are within the purview of the National Eye Institute. We believe, however, that b), c) and d) are appropriate areas of endeavor for the Institute. Recommendation b) could be implemented through the medium of a national survey of blindness or severe visual impairment to settle the arguments still going on about these figures. Recommendation c) is one, the importance of which was urged upon us by the opthalmological consultant to this study, Dr. Richard E. Hoover. Such research would contribute greatly to better statistics from such ongoing survey systems as the Health Interview Survey and the Health and Nutrition Examination Survey. Recommendation d) requires active participation in the negotiations that take place during the decennial revisions of the International Classification. Unfortunately, the current revision cycle is just now drawing to a close. Finally, recommendation h) is one suggested to us by the top-ranking economist in NIH. It is one in which we heartily concur. Since NIH makes considerable use of these figures, such a study might well be launched by the Institutes as a whole.

006155

9. CONCLUSION

In bringing this task to an end we would like to thank the National Eye Institute for giving us the opportunity to undertake this fascinating exploration. We do not know whether it meets NEI's expectations, but we do know we have ourselves learned a great deal in the course of the study and hope that at least some of what we have recorded here is new and useful to you as well.

000156

APPENDIX A

COMPLETE LIST OF ORIGINAL SOURCES CONTACTED

APPENDIX A

American Foundation for the Blind, Inc.
Mr. L. Eugene Apple, Executive Director
New York, New York

Blue Cross/Blue Shield of Massachusetts
Mr. Ernest J. Lampron, Director
of Actuarial Statistics Services
Boston, Massachusetts

Blue Cross of Northeast Ohio
Quality Utilization Effectiveness Statistically
Tabulated (QUEST)
Research and Planning Department
Mr. John R. Mannix
Cleveland, Ohio

California Department of Health
Center for Health Statistics
Mr. John Keith
Sacramento, California

California Health Data Corporation
Mr. George D. Tipp, Jr.
Director of Marketing and Customer Relations
Sacramento, California

Civilian Health and Medical Program of the Uniformed
Services (CHAMPUS)
Mr. Warren Shaw, Statistical Division
Denver, Colorado

General Electric Company
Medinet Application Operation
J.N. Carro, Information Services
Rockville, Maryland

Hyman Goldstein, Ph.D.
Research Statistician
Internal and Child Health Program
University of California
Berkeley, California

Health Data Service
Maryland Blue Cross, Inc.
Ms. Marsha Silvers, R.R.A.
Baltimore, Maryland

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Health Data Systems
Utilization Review Department
Florida Blue Cross
Mr. Dale Doukerly, Manager
Jacksonville, Florida

Health Insurance Plan of Greater New York
Dr. Raymond Fink, Vice President
and Director of Research
New York, New York

Health Service Data
Sidney Shindell, M.D., Executive Director
Milwaukee, Wisconsin

Hospital Utilization Project
William A. O'Neil, Director for Systems and Research
Pittsburgh, Pennsylvania

IMS America, Ltd.
National Disease and Therapeutic Index (NDTI)
Mr. Larry Levin, Director
Ambler, Pennsylvania

Kaiser Foundation Health Plans
Public Affairs Department
Mr. Richard Edwards
Data Request Coordinator
Oakland, California

Kansas Department of Social Welfare
Division of Services for the Blind
Mr. Harry E. Hayes, Director
Topeka, Kansas

The Library of Congress
Division for the Blind and Physically Handicapped
Reference Section
Ms. Hylda Kamisas, Chief
Washington, D.C.

Massachusetts Eye and Ear Infirmary
Dr. Claes Dohlman, Chief of Ophthalmology
Boston, Massachusetts

Medi-Record Service Computer Applications, Inc.
Suburban Data Processing Center
John H. Schumacher, Manager
West Caldwell, New Jersey

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Missouri State Department of Health
Missouri Hospital Discharge Data System
State Center for Health Statistics
Mr. Wayne Miller, Division of Health
Jefferson City, Missouri

National Accreditation Council for Agencies
Serving the Blind and Visually Handicapped
Miss Ann L. New
Consultant on Community Relations
New York, New York

National Association of Blue Shield Plans
Actuarial Services
Jack H. Esterkin, Director
Chicago, Illinois

National Society for the Prevention of Blindness
Mrs. Elizabeth Hatfield, Statistician
New York, New York

New Jersey State Commission for the Blind
Mr. Joseph Kohn, Executive Director
Newark, New Jersey

North Carolina Department of Human Resources
Division of Services for the Blind
Mr. Jack C. Scott, Deputy Chief
Program Evaluation and Statistics
Raleigh, North Carolina

Professional Activity Study (PAS)
Commission on Professional and Hospital Activities
Project Development
A.H. Spellman, Director
Ann Arbor, Michigan

Rand Corporation
Medical Systems Group
Health Sciences Programs
M.A. Rockwell, M.D. Director
Santa Monica, California

Rhode Island Department of Social and Rehabilitative Services
State Services for the Blind
Mr. E. Lyman D'Andrea, Administrator
Providence, Rhode Island

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Steck Data Corporation
Steck Data Processing
Mr. Howard Widner, Manager
Austin, Texas

U.S. Consumer Product Safety Commission
Bureau of Epidemiology
Mr. Kenneth Haase
Assistant Director
Washington, D.C.

U.S. Department of Defense
Armed Forces Institute of Pathology
Department of Ophthalmic Pathology
Dr. Lorenz Zimmerman, Chief
Washington, D.C.

U.S. Department of Defense
Office of the Army Surgeon General
Patient Administration Office
Mr. Herbert Evert, Statistician
Washington, D.C.

U.S. Department of Health, Education and Welfare
National Institutes of Health
National Cancer Institute
Biometry Branch, Demography Section
Mr. Joseph Scotto, Senior Services
Bethesda, Maryland

U.S. Department of Health, Education and Welfare
Public Health Service
Health Resources Administration
National Center for Health Statistics
Dr. Edward Perrin, Director
Rockville, Maryland

A. Health Interview Survey (HIS)
Mr. Robert Fuchsburg
Supervisory Statician (General)

B. Health and Nutrition Examination Survey (HANES) - 1973
Mrs. Jeanne Roberts
Supervisor Statistician (Health)

C. National Ambulatory and Medical Care Survey (NAMCS)
Mr. James Delozier, Chief

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D. Hospital Discharge Survey (HDS)
Mr. Abraham Ranofsky
Survey Statistician

E. Resident Places Survey (RPS)
Ms. Joan F. VanNostrand
Supervisory Survey Statistician

U.S. Department of Health, Education and Welfare
Rehabilitation Services Administration
Office for the Blind and Visually Handicapped
Mr. George Mayers, Assistant Chief
Division of Services to the Blind
Mr. Warren Bledsoe, Consultant
Washington, D.C.

U.S. Department of Health, Education and Welfare
Rehabilitation Services Administration
Office of Human Development
Dr. Andrew S. Adams, Commissioner
Washington, D.C.

U.S. Department of Health, Education and Welfare
Social Security Administration
Office of Research and Statistics
Ms. Barbara Cooper, Social Science Research Analyst
Washington, D.C.

U.S. Department of Health, Education and Welfare
Social Security Administration
Office of Research and Statistics
Division of Health Insurance
Statistics Systems and Procedures
Mr. Aaron Krute, Deputy Director
Mr. Gene Stickler, Chief
Baltimore, Maryland

U.S. Department of Labor
Bureau of Labor Statistics
Occupational Safety and Health Administration
Division of Periodic Surveys
Mr. William Mead, Chief
Washington, D.C.

Utilization Information Service Program
Massachusetts Hospital Association
Mrs. Marjorie Gurney, Manager
Burlington, Massachusetts

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Vermont Department of Social Welfare
Division for the Blind and Visually Handicapped
Mr. Howard E. Walbridge, Director
Mintpelier, Vermont

Veterans Administration
Blind Rehabilitation
Dr. Russell Williams, Director
Washington, D.C.

Wills Eye Hospital
Thomas D. Duane, M.D., Ph.D.
Ophthalmologist-In-Chief
Philadelphia, Pennsylvania

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APPENDIX B

COPIES OF QUESTIONNAIRES A-D

OMB #68S-75017
Expires Aug. 31, 1975

VISUAL DISORDERS AND DISABILITIES PROJECT

A. Morbidity and Medical Care Sample Surveys and Censuses

Name: _____ Agency: _____ Date: _____

Title of Data Collection System _____

1. As set forth in the accompanying letter, we are interested in obtaining a general description of all surveys, and other data collection systems that are capable of providing statistics on incidence, or prevalence, or health care services used, or costs, of visual disorders and impairments of vision.

   The first thing we need to know regarding the data collection system named above is the population represented. By this we mean: If one were to compute a population rate from data collected in this system, what would be the appropriate population denominator? (e.g., civilian non-institutional population of the U.S., population of a particular state, persons insured under a particular plan, etc.)

   Please describe the population covered. _____

   _____

   _____

2. How are the data on morbidity or medical care collected? (Check one)

   (1) ☐ Interviews in homes (including telephone interviews)

   (2) ☐ Mail questionnaires to individuals or families

   (3) ☐ Examinations of individuals

   (4) ☐ Abstracting of existing in-patient hospital records

   (5) ☐ Abstracting of existing clinic and ambulatory care records

000167

(6) ☐ Creation of a special record by medical care personnel in the course of treatment

(7) ☐ Combinations of the above (Indicate which) _____

_____

(8) ☐ Other (Describe) _____

_____

3. How are the data on the population denominators used in the computation of rates collected? (Check one)

(1) ☐ From household rosters recorded in the survey (with or without adjustment to Census totals)

(2) ☐ From appropriate Census statistics independent of the survey

(3) ☐ Other (Describe) _____

_____

4. Is the system for recording the diagnosis of morbidity or medical care classified on an open-ended basis, or is the survey limited to certain diseases or impairments?

(1) ☐ There is an open-ended classification by diagnosis

(2) ☐ The survey is limited to a classification of diagnosis by certain diseases or visual impairments (Skip to Question 6)

(3) ☐ Neither (Skip to Question 7)

5(a). What coding system is used for classifying the morbidity or medical care by diagnosis?

(1) ☐ ICDA (If ICDA, to what level of detail?) _____

_____

(2) ☐ Other (Please describe and indicate level of detail)

_____

_____

_____

000168

(b). Can you produce statistics from the survey on morbidity or medical care for the following diagnostic categories, specifically: (If yes, check all that apply)

(1) ☐ Glaucoma

(2) ☐ Cataract

(3) ☐ Diseases of the retina

(4) ☐ Refractive error

(5) ☐ Diseases of the cornea and sclera

(6) ☐ Uveitis

(7) ☐ Optic nerve diseases

(8) ☐ Sensory-motor disorders, such as amblyopia and strabismus

(9) ☐ Injury to the eye, by type of injury

(10) ☐ All of the above

(c). Does your coding system permit identifying the etiology of eye disorders, such as: diabetes, neoplasm, injury, surgical removal, congenital, etc.? (Check one)

(1) ☐ Yes

(2) ☐ Yes, to a limited extent. (Please explain)

_____

_____

(3) ☐ No

(d). Does your coding system permit classification of the amount of visual disability caused, such as: no light perception, legal blindness, other severe visual disability (such as inability to read newspaper print even with glasses), etc. (Check one)

(1) ☐ Yes

000169

(2) ☐ Yes, to a limited extent (Please explain)

_____

_____

(3) ☐ No (Skip to Question 8)

6. Please explain to what diseases or visual impairments the survey is limited and what classification is possible?

_____

_____

_____

(Skip to Question 8)

7. Is this survey capable of producing any statistics on morbidity or medical care specifically related to eye diseases or impairments of vision?

(1) ☐ Yes (Please explain nature of the survey and then continue with Question 8)

_____

_____

_____

(2) ☐ No (Complete no further questions and return the questionnaire)

8. What measures of morbidity or medical care can be produced from the survey? (Check all that apply)

(1) ☐ Incidence of new cases during specified time period(s)

(2) ☐ Prevalence, i.e. number of cases in the population at one time or averaged over a period of time

(3) ☐ Number of physician visits attributable to particular eye diseases or conditions

(4) ☐ Number of hospital stays attributable to particular eye diseases or conditions

(5) ☐ Number of patients in nursing homes and/or other long-term care establishments attributable to particular eye diseases or conditions

000170

(6) ☐ Other (Please specify) _____

_____

_____

9. Into what demographic categories can the data on morbidity or medical care for particular eye diseases or conditions be classified? (Check all that apply)

(1) ☐ Age groups

(2) ☐ Sex

(3) ☐ Race

(4) ☐ Other (Please specify) _____

_____

_____

10. Is the survey capable of producing any data on costs attributable to particular eye diseases or conditions, either direct costs of medical care or indirect costs in terms of disability or lost income?

(1) ☐ Yes (Please specify) _____

_____

_____

(2) ☐ No

11. Is the survey a continuing, periodic, or one-time activity? (Check one)

(1) ☐ Continuing (If "yes", is the same sample followed over a period of time?) ☐ Yes ☐ No

(2) ☐ Periodic

(3) ☐ One-time

12. If the questions above have not adequately described this data collection system for the purposes indicated in the accompanying letter, please comment here. We would also

appreciate having copies of forms and instructions used in the course of data collection.

THANK YOU

VISUAL DISORDERS AND DISABILITIES PROJECT

B. Reporting System Based on Claims Submitted, Services Provided, or Other Required Reporting in a Public Program

Name: _____ Agency: _____ Date: _____

Title of Data Collection System _____

1. As set forth in the accompanying letter, we are interested in obtaining a general description of all surveys, and other data collection systems that are capable of providing statistics on incidence, or prevalence, or health care services used, or costs, of visual disorders and impairments of vision.

The first thing we need to know regarding the data collection system named above is the population represented. By this we mean: If one were to compute a population rate from data collected in this system, what would be the appropriate population denominator? (e.g., civilian non-institutional population of the U.S., population of a particular state, persons insured under a particular plan, etc.)

Please describe the population covered. _____

_____

_____

2. What is the nature of the basic record from which the data are derived? (Check one)

(1) ☐ Claim for reimbursement for health care provided

(2) ☐ Claim for disability compensation

(3) ☐ Required report of illness or accidental injury for regulatory or accident control purposes

000173

(4) ☐ Reporting of a service provided under a public service program

(5) ☐ Other (Please describe) _____

_____

3. If one wishes to compute population rates from the data collected, how are the population denominators derived? (Check one)

(1) ☐ From appropriate Census statistics for the covered population

(2) ☐ From administrative data on persons eligible

(3) ☐ Other (Please describe) _____

_____

4(a). Does the basic record contain information on the diagnosis for which service was provided, or the cause of the disability, or the type of injury or disease reported?

(1) ☐ Yes

(2) ☐ No (Skip to Question 7)

(b). What is the source of the diagnostic information, or cause of disability, or description of type of injury, or disease reported? (Check one)

(1) ☐ Report of attending physician

(2) ☐ Other (Please describe) _____

_____

5(a). What coding system is used for classifying the diagnoses or causes of disability, types of injury, or diseases reported?

(1) ☐ ICDA (If ICDA, please indicate level of detail) _____

(2) ☐ Other coding system (Please describe and indicate level of detail) _____

_____

(3) ☐ Not coded, but series of check boxes is used (Please attach copy of form used when returning this questionnaire)

(4) ☐ No classification is possible but data collection is limited to certain diseases of vision or visual impairments (Skip to Question 6)

(5) ☐ Data collection is not limited to certain diseases or impairment but no classification is possible (Skip to Question 7)

(6) ☐ Other (Please explain) _____

_____

(b). Can this data collection system produce statistics on health care provided, or disability, or incidence of disease or injury for the following diagnostic categories, specifically? (Check all appropriate boxes)

(1) ☐ Glaucoma

(2) ☐ Cataract

(3) ☐ Diseases of the retina

(4) ☐ Refractive error

(5) ☐ Diseases of the cornea and sclera

(6) ☐ Uveitis

(7) ☐ Optic nerve diseases

000175

(8) ☐ Sensory-motor disorders, such as amblyopia and strabismus

(9) ☐ Injury to eye, by type of injury

(10) ☐ All of the above

(c). Can this data collection system produce statistics on the etiology of eye disorders, such as: diabetes, neoplasm, injury, surgical removal, congenital, etc.? (Check one)

(1) ☐ Yes, in considerable detail

(2) ☐ Yes, to a limited extent (Please explain) _____

_____

(3) ☐ No

(d). Can this data collection system produce statistics on the amount of visual disability caused, such as: no light perception, legal blindness, other severe visual disability (such as inability to read newspaper print even with glasses), etc.? (Check one)

(1) ☐ Yes, in considerable detail

(2) ☐ Yes, to a limited extent (Please explain) _____

_____

(3) ☐ No (Skip to Question 8)

6. (For data collection systems limited to certain diseases of vision or visual impairments)
Please explain to what diseases or visual impairments the data collection system is limited and what classification is possible _____

_____

_____

000176

7. If "NO" in Question 4(a) or if a check has been placed in 5(a)(5)

Is this data collection system capable of producing any statistics on the incidence of eye diseases or injuries, or on visual impairment, or on services provided or costs of visual disorders or impairment?

(1) ☐ Yes (Please explain the nature of the system and then continue with Question 8

_____

_____

(2) ☐ No (Complete no further questions and return the questionnaire)

8. What measures of morbidity or medical care can be produced from this data collection system? (Check all that apply)

(1) ☐ Incidence of new cases during specified time period(s).

(2) ☐ Prevalence, i.e. number of cases in the population at one time, or averaged over a period of time

(3) ☐ Number of medical services attributable to particular eye diseases or conditions

(4) ☐ Number of hospital stays attributable to particular eye diseases or conditions

(5) ☐ Number of patients being cared for in nursing homes and/or other long-term care establishments attributable to particular eye diseases or conditions

(6) ☐ Other (Please specify) _____

_____

000177

9(a). Into what demographic categories can the data described in Question 8 for particular eye diseases or conditions be classified? (Check all that apply)

(1) ☐ Age groups

(2) ☐ Sex

(3) ☐ Race

(4) ☐ Other (Please specify) _____

_____

(b). Can the corresponding population denominators, mentioned in Question 3, be obtained for the same demographic categories so that rates specific for age, sex, etc., can be computed? (Check one)

(1) ☐ Yes, for all mentioned in 9(a)

(2) ☐ Yes, but only for some mentioned in 9(a)
(Please explain) _____

_____

(3) ☐ Population denominator characteristics not known or not available

10. Is this data collection system capable of producing any statistics on costs attributable to particular eye diseases, injuries, or impairment of vision, either direct costs of (or charges for) medical care, or indirect costs in terms of disability or lost income?

(1) ☐ Yes (Please specify) _____

_____

(2) ☐ No

000178

11. Is this data collection system a continuing, periodic, or one-time activity? (Check one)

☐ Continuing If "yes", Is it possible to follow the same group of people over a period of time?

☐ Yes ☐ No

☐ Periodic (Please indicate frequency) _____

_____

☐ One-time

12. If the questions above have not adequately described this data collection system for the purposes indicated in the accompanying letter, please comment here. We would also appreciate having copies of forms and instructions used in the course of data collection.

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU

000173

OMB #68S-75017
Expires Aug. 31, 1975

VISUAL DISORDERS AND DISABILITIES PROJECT

C. Blindness Registers

Name:_____ Agency_____ Date_____

Title of Data Collection System _____

1. As set forth in the accompanying letter, we are interested in obtaining a general description of all surveys, and other data collection systems that are capable of providing statistics on incidence, or prevalence, or health care services used, or costs, of visual disorders and impairments of vision.

   The first thing we need to know regarding the data collection system named above is the population represented. By this we mean: If one were to compute a population rate from data collected in this system, what would be the appropriate population denominator? (e.g., civilian non-institutional population of the U.S., population of a particular state, persons insured under a particular plan, etc.)

   Please describe the population covered. _____

   _____

   _____

2(a). What are the major sources of information for adding new cases to this register?_____

   _____

   _____

   _____

000181

(b).What means are used to discover and remove from this register (or identify separately) those cases which

(1) Are no longer residing in the area covered by the register? _____

_____

(2) Are no longer living? _____

_____

(3) ☐ No procedures for removing or identifying separately non-resident and deceased cases.

(c).Are the procedures described in 2(b) carried out continuously or periodically? (Check one)

(1) ☐ Continuously

(2) ☐ Periodically (Please specify usual interval)

_____

3. If one wishes to compute population rates from the data in the register, how are the population denominators derived? (Check one)

(1) ☐ From appropriate Census statistics for the area covered.

(2) ☐ Other (Please describe) _____

_____

4(a).Does the basic record in the register contain information on the disease or injury causing blindness?

(1) ☐ Yes

(2) ☐ No (Skip to Question 8)

(b).What is the source of the diagnostic information specified in 4(a)? (Check one)

(1) ☐ Report of attending physician

(2) ☐ Other (Please describe)

000182

5(a). Can this register produce statistics for the following diagnostic categories, specifically? (Check all appropriate boxes)

(1) ☐ Glaucoma

(2) ☐ Cataract

(3) ☐ Diseases of the retina

(4) ☐ Diseases of the cornea and sclera

(5) ☐ Uveitis

(6) ☐ Optic nerve diseases

(7) ☐ Sensory motor disorders, such as amblyopia and strabismus

(8) ☐ Injury to the eye, by type of injury

(9) ☐ All of the above

(b). Can this register produce statistics on the etiology of the cases included, such as: diabetes, neoplasm, injury, surgical removal, congenital, etc.? (Check one)

(1) ☐ Yes, in considerable detail

(2) ☐ Yes, to a limited extent (Please explain) _____

_____

(3) ☐ No

(c). What is the criterion of visual impairment used in determining which cases to include in this register?

(d). Can the cases in the register be classified by degree of visual impairment?

(e). (1) ☐ Yes (Please describe the classification used) ____

_____

(2) ☐ No

000183

QUESTIONS 6 AND 7 ARE OMITTED ON THIS QUESTIONNAIRE. PLEASE PROCEED WITH QUESTION 8

8(a). Can this register produce statistics on incidence (new cases in the population during specified time period(s)) and also prevalence (number of cases in the population at any one time, or average over a period of time)? (Check one)

(1) ☐ Yes, both

(2) ☐ Yes, prevalence only

(3) ☐ Yes, incidence only

(4) ☐ Neither, or doesn't apply (Please explain) _____

_____

(b). Does the register include information on the medical care, treatment, or rehabilitation that has been provided to the cases? (Check one)

(1) ☐ Yes (Please indicate items included or enclose copy of basic form when returning questionnaire)

(2) ☐ No

(c). Does the register include information on whether the cases are living in their own homes or in residential institutions? (Check one)

(1) ☐ Yes If "yes", Does it indicate the type of institution? ☐ Yes ☐ No

(2) ☐ No

9(a). Into what demographic categories can the data described in Question 8 for particular eye diseases or conditions be classified? (Check all that apply)

(1) ☐ Age groups

(2) ☐ Sex

(3) ☐ Race

(4) ☐ Other (Please specify) _____

_____

000184

(b). Can the corresponding population denominators, mentioned in Question 3, be obtained for the same demographic categories so that rates specific for age, sex, etc., can be computed? (Check one)

(1) ☐ Yes, for all mentioned in 9(a)

(2) ☐ Yes, but only for some mentioned in 9(a)
(Please explain) _____

_____

(3) ☐ Population denominator characteristics not known or not available

10. Is this register capable of producing any statistics on costs attributable to particular eye diseases, injuries, or impairment of vision, either direct costs of (or charges for) medical care, or indirect costs in terms of disability or lost income.

(1) ☐ Yes (Please specify) _____

_____

(2) ☐ No

11(a). How long has this register been in existence?

_____

(b). Do you have any information or impressions about the percentage of completeness of the register, i.e. what percentage of the cases the register is designed to include are actually included?

_____

_____

000185

12. If the questions above have not adequately described this data collection system for the purposes indicated in the accompanying letter, please comment here. We would also appreciate having copies of forms and instructions used in the course of data collection.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU

000186

OMB #68S-75017
Expires Aug. 31, 1975

VISUAL DISORDERS AND DISABILITIES PROJECT

D. Hospital Discharge Abstracting Systems

Name:_____ Agency:_____ Date:_____

Title of Data Collection System _____

1. As set forth in the accompanying letter, we are interested in obtaining a general description of all surveys, and other data collection systems that are capable of providing statistics on incidence, or prevalence, or health care services used, or costs, of visual disorders and impairments of vision.

The first thing we need to know regarding the hospital discharge abstracting system named above is the extent to which the system covers the short-term hospitalization experience of a defined population. By this we mean: is there a population such that one can appropriately use data from the abstracting system to represent all, or nearly all, of the short-term hospitalization provided to that population? If so, how can one describe that population? (Please explain)

_____

_____

QUESTION 2 IS OMITTED ON THIS QUESTIONNAIRE. PLEASE PROCEED WITH QUESTION 3

3. If one wishes to compute population rates from the data collected, how can the population denominators be derived? (Check one)

(1) ☐ From appropriate Census statistics for a defined area

(2) ☐ Other (Please describe) _____

_____

000187

4. What diagnoses are recorded on the discharge abstract? (Check all that apply)

- ☐ Admitting diagnosis
- ☐ "Principal," or first listed, or diagnosis principally responsible for the stay, as finally determined
- ☐ Other diagnoses If checked, Up to how many? _____

5(a). What coding system is used for classifying the diagnosis referred to in Question 4?

(1) ☐ ICDA If ICDA Please specify level of detail _____

(2) ☐ HICDA If HICDA Please specify level of detail _____

(3) ☐ Other coding system. (Please describe and indicate level of detail) _____

_____

(b). Is the coding carried out in the hospitals or centrally? (Check one)

(1) ☐ In the hospitals entirely

(2) ☐ In the hospitals but with complete or sample checking done centrally

(3) ☐ Done centrally

(4) ☐ Other (Please specify) _____

_____

(c). Can this abstracting system produce statistics on the etiology of eye disorders cared for, such as: diabetes, neoplasm, injury, surgical removal, congenital, etc. (Check one)

(1) ☐ Yes, in considerable detail

(2) ☐ Yes, to a limited extent (Please explain) _____

_____

(3) ☐ No

000188

(d). Can this abstracting system produce statistics on the amount of visual disability caused, such as: no light perception, legal blindness, other severe visual disability (such as inability to read newspaper print even with glasses), etc.? (Check one)

(1) ☐ Yes, in considerable detail

(2) ☐ Yes, to a limited extent (Please explain) _____

_____

(3) ☐ No

QUESTIONS 6 AND 7 ARE OMITTED ON THIS QUESTIONNAIRE. PLEASE PROCEED TO QUESTION 8

8. In addition to statistics on discharge rates, what other kinds of statistics can be produced from this abstract system for eye diseases and injuries? (Check all that apply)

(1) ☐ Statistics on days of care

(2) ☐ Distributions of cases by length of stay

(3) ☐ Operations performed for specified diseases by type of operation

(4) ☐ Non-surgical services and tests performed for patients with specified diagnosis. (Please indicate or enclose copy of abstract form when returning this questionnaire)

9(a). Into what demographic categories can the data described in Question 8 for particular eye diseases or conditions be classified? (Check all that apply)

(1) ☐ Age groups

(2) ☐ Sex

(3) ☐ Race

(4) ☐ Other (Please specify) _____

_____

(b). Can the corresponding population denominators, mentioned in Question 3, be obtained for the same demographic categories so that rates specific for age, sex, etc., can be computed? (Check one)

(1) ☐ Yes, for all mentioned in 9(a)

(2) ☐ Yes, but only for some mentioned in 9(a)
(Please explain) _____

_____

(3) ☐ Population denominator characteristics not known or not available

10. Is this abstracting system capable of producing any statistics on costs attributable to particular eye diseases, injuries, or impairment of vision, either direct costs of (or charges for) medical care, or indirect costs in terms of disability or lost income?

(1) ☐ Yes (Please specify) _____

_____

(2) ☐ No

11. Is this abstracting system a continuing, periodic, or one-time activity? (Check one)

☐ Continuing If "yes", Is it possible to follow the same group of people over a period of time?

☐ Yes ☐ No

☐ Periodic (Please indicate frequency) _____

_____

☐ One-time

000190

12. If the questions above have not adequately described this abstracting system for the purposes indicated in the accompanying letter, please comment here. We would also appreciate having copies of forms and instructions used in the course of data collection.

THANK YOU

APPENDIX C

SAMPLE FORMAT OF MASTER LOG

Visual Disorders Master Log

Name of Agency	Person Contacted	Questionnaire Type	Date Sent	Request for Additional Information	Date Returned	Final Status			Recommendation	
						Complete	Incomplete	No Info	Information Applicable	Comments

000194

APPENDIX D

LITERATURE SEARCH

PART I - Medlars Search

PART II - NTIS Search

TI- Health of the elderly.
SO- Stat Bull Metropol Life Ins Co 55(0):9-11, Jul 74

AU- Steinhart MJ
TI- Psychiatric aspects and management of aging patient.
SO- [illegible] State J Med 74(6):976-8, Jun 74

AU- Sankes JL
TI- Eye defects of mentally handicapped children.
SO- Br Med J 2(918):535-5, 8 Jun 74

AU- Newer HL
TI- Quantification of strokes.
SO- Proc R Soc Med 67(5):404-6, May 74

AU- Asnes RS ; Feldman B ; Gersony WM ; Morrison S ; Weiss M
TI- The medical care of children at summer camps. An evaluation of 1,412 infirmary visits.
SO- Am J Dis Child 128(1):64-6, Jul 74

AU- Anderson BK
TI- Sensory impairments in hemiplegia.
SO- Arch Phys Med Rehabil 52(7):293-7, Jul 71

AU- Linay L ; Stuart J
TI- Sympathetic ophthalmia in Canada.
SO- Can J Ophthalmol 7(2):157-9, Apr 72

AU- Gillquist J ; Karlberg B ; Sjödahl R ; Tegler L
TI- Preoperative treatment of hyperthyroidism. Effect on primary postoperative complications.
SO- Acta Chir Scand 140(1):23-6, 1974

000197

AU- Eason CF
TI- Medical exposures of radiation workers--should they be recorded?
SO- J Occup Med 16(3):189-91, Mar 74

AU- Loudet C ; Arnaud B ; Kascanaivo R
TI- [Statistical review of bulbus injuries. Report of 363 cases (author's transl)]
SO- Klin Monatsbl Augenheilkd 163(5):612-23, Nov 73

AU- Pinter L ; Biro A ; Berencsi G
TI- [Treatment of corneal herpes with a photosensitizing dye (author's transl)]
SO- Klin Monatsbl Augenheilkd 163(5):600-4, Nov 73

AU- Grant HE
TI- The new Supplemental Security Income Program.
SO- Ill Med J 145(2):131-2 passim, Feb 74

AU- Galin MA ; Baras I ; Barasch K ; Boniuk V
TI- Immediate ambulation and discharge after cataract extraction.
SO- Trans Am Acad Ophthalmol Otolaryngol 78(1):OP43-9, Jan-Feb 74

AU- McCoy LP
TI- The practicing physician and the new supplemental security income program.
SO- W Va Med J 69(12):357-9, Dec 73

AU- Gorman CA ; DeSanto LW ; MacCarty CS ; Riley FC
TI- Optic neuropathy of graves's disease. Treatment by transantral or transfrontal orbital decompression.
SO- N Engl J Med 290(2):70-5, 10 Jan 74

AU- Peckham CS
TI- A national study of child development (NCDS 1958 cohort). Preliminary findings in a national sample of 11-year-old children.
SO- Proc R Soc Med 66(7):701-3, Jul 73

AU- Wilson A
TI- Experience with a multidiscipline assessment team for visually handicapped children.
SO- Proc R Soc Med 66(7):616-8, Jul 73

AU- Pritt AS
TI- Functional assessment of handicapped children: an introduction.
SO- Proc R Soc Med 66(7):611-2, Jul 73

AU- Rocca A ; el-Kashlan K ; Kassem A
TI- The pattern of hospitalised ocular injuries in Alexandria University Hospital.
SO- Bull Ophthalmol Soc Egypt 65(69):269-81, 1972

AU- Martin WM ; Loewenson RB ; Resch JA ; Baker AB
TI- Parkinson's disease. Clinical analysis of 100 patients.
SO- Neurology (Minneap) 23(8):783-90, Aug 73

AU- Dressel AC ; Meirowsky AM ; Weiss GH ; McNeel ML ; Simon GA
AU- Caveness WF
TI- Gainful employment following head injury. Prognostic factors.
SO- Arch Neurol 29(2):111-6, Aug 73

AU- Mills RV
TI- Duration of in-patient care following cataract extraction.
SO- Trans Ophthalmol Soc UK 92:637-43, 1972

AU- Strachan IA ; Bowell RE
TI- Reduced in-patient stay following cataract extraction.
SO- Trans Ophthalmol Soc UK 92:629-36, 1972

AU- Kahana RJ
TI- Personality and response to physical illness.
SO- Adv Psychosom Med 8:42-62, 1972

000199

AU- Keller AZ
TI- Histology, survivorship and related factors in the epidemiology of eye cancers.
SO- Am J Epidemiol 97(6):366-93, Jun 73

AU- Phillips CI
TI- Motes and beams.
SO- Lancet 5:19:33-5, 7 Jul 73

AU- Shibasaki H ; Kuroiwa Y
TI- Clinical studies of multiple sclerosis in Japan. II. Are its clinical characteristics changing?
SO- Neurology (Minneap) 23(6):616-22, Jun 73

AU- Kelman CD
TI- Phaco-emulsification and aspiration. A report of 500 consecutive cases.
SO- Am J Ophthalmol 75(5):764-8, May 73

AU- Pockley EV
TI- Heat cataract.
SO- Trans Aust Coll Ophthalmol 3:84-6, 1971

AU- Gocka EF
TI- Analysis of length-stay data with incomplete observations.
SO- Psychol Rep 32(2):343-58, Apr 73

AU- Miles DA ; Hurite FG
TI- Results of the first year's experience with phaco-emulsification.
SO- Am J Ophthalmol 75(3):473-7, Mar 73

AU- Scamia PR
TI- Major types of rheumatic diseases.
SO- Ind Med Surg 42(4):7-8, Apr 73

AU- Doree JH ; Taylor E
TI- Treatment of proliferative diabetic retinopathy by repeated light coagulation. A 7-year review.
SO- Br J Ophthalmol 57(2):73-86, Feb 73

AU- [illegible] ; Wick JL JR ; Billings CI
TI- Five year study of general aviation physical examinations.
SO- Aerosp Med 44(1):76-9, Jan 73

AU- Duchon AS ; Marchand R
TI- Preoperative care in routine cataract extraction. A comparative study in the United Kingdom.
SO- Br J Ophthalmol 56(9):671-7, Sep 72

AU- Baloh RW
TI- Shoplifters with vestibular involvement.
SO- Arch Otolaryngol 97(1):65-7, Jan 73

AU- Inglis JD
TI- Vestibular and medico-legal aspects of closed cranio-cervical trauma.
SO- Scand J Rehabil Med 4(3):126-32, 1972

AU- Lakshmi PK
TI- Colour vision in the legally blind.
SO- Can J Ophthalmol 7(3):302-5, Jul 72

AU- McCrae AC ; McCrae L
TI- Retinal injuries caused by intraocular foreign bodies--new trends in causation:
SO- Can J Ophthalmol 7(3):291-6, Jul 72

AU- Gordon IG
TI- Traumatic retinal detachments in Moorfields Eye Hospital.
SO- Br J Ophthalmol 56:538-9, 1972

AU- [illegible] ; Viskum K
TI- Manifestations and course of the disease in intrathoracic sarcoidosis.
SO- [illegible] Dis 53(3):174-80, 1972

AU- [illegible] ; Pearlman JT
TI- Prevention of mental disorders in ophthalmic patients.
SO- Am Ophthalmol 4(7):555-60, Jul 72

AU- Kurtzke JF ; Beebe GW ; Jaeger S ; Auth TL ; Kurland LT ; Nefzger MD
TI- Studies on the natural history of multiple sclerosis. 6. Clinical aspects of migration, changes at first diagnosis.
SO- Acta Neurol Scand 48(1):19-46, 1972

AU- [illegible]
TI- Consecutive psychogeriatric admissions to psychiatric and geriatric hospitals.
SO- Geriatrics 26(5):156-66, May 71

AU- [illegible] ; Wagas H ; Borger JA
TI- [illegible] of verbal skills of institutionalized retarded patients.
SO- [illegible] Mental Def 76(5):555-60, Mar 72

AU- Auer L
TI- [illegible] effects of chronic disease and impairment.
SO- J Chronic Dis 24(7):469-87, Sep 71

TI- Health of older people.
SO- [illegible] Metropol Life Ins Co 52:8-9, Sep 71

AU- [illegible] ; Taylor VL
TI- The assessment and care of the deaf-blind child.
SO- Physiotherapy 57(9):415-7, 10 Sep 71

000102

TI- Health of the elderly.
SO- Stat Bull Metropol Life Ins Co 55(0):9-11, Jul 74

AU- Portney GL ; Portney SB
TI- Five-year perspective on trachoma in the San Xavier Papago Indian.
SO- Arch Ophthalmol 92(3):211-2, Sep 74

AU- Hamilton JE
TI- Vision anomalies of school children.
SO- Am J Optom Physiol Opt 51(7):482-6, Jul 74

AU- Cooper J ; Lieberman S ; Flax N
TI- Analysis of optometric findings using a punch card retrieval system.
SO- Am J Optom Physiol Opt 51(7):478-81, Jul 74

AU- Chasis H
TI- Appraisal of antihypertensive drug therapy.
SO- Circulation 50(1):4-8, Jul 74

AU- Kahn HA ; Hiller R
TI- Blindness caused by diabetic retinopathy.
SO- Am J Ophthalmol 78(1):58-67, Jul 74

AU- Knowles HC Jr
TI- Long-term juvenile diabetes treated with unmeasured diet.
SO- Trans Assoc Am Physicians 84:95-101, 1971

AU- Hierholzer JC ; Guyer B ; O'Day D ; Schaffner W
TI- Letter: Adenovirus type 19 keratoconjunctivitis.
SO- N Engl J Med 290(25):1436, 20 Jun 74

000203

AU- Welsh LW ; Welsh JJ
TI- Orbital complications of sinus diseases.
SO- Laryngoscope 84(5):848-56, May 74

AU- Cherington M
TI- Botulism. Ten-year experience.
SO- Arch Neurol 30(6):432-7, Jun 74

AU- Offutt RL ; Shine I
TI- Perforating injuries of the eye due to glass.
SO- Ann Ophthalmol 6(4):357-63, Apr 74

AU- Brown DH
TI- The geography of ocular Toxocara canis.
SO- Ann Ophthalmol 6(4):343-4, Apr 74

AU- Bolton DP ; Cross KW
TI- Further observations on cost of preventing retrolental fibroplasia.
SO- Lancet 1(855):445-8, 16 Mar 74

AU- Scheie HG ; Shannon RE ; Yanoff M
TI- Onchocerciasis (ocular).
SO- Ann Ophthalmol 3(7):697-700, Jul 71

AU- Caldwell GG ; Lindsey NJ ; Wulff H ; Donnelly DD ; Bohl FN
TI- Epidemic of adenovirus type 7 acute conjunctivitis in swimmers.
SO- Am J Epidemiol 99(3):230-4, Mar 74

AU- Galin MA ; Baras I ; Barasch K ; Boniuk V
TI- Immediate ambulation and discharge after cataract extraction.
SO- Trans Am Acad Ophthalmol Otolaryngol 78(1):OP43-9, Jan-Feb 74

000204

AU- Preble MR ; Prendergast TJ
TI- Corneal foreign bodies--sparks from bumper-car rides.
SO- N Engl J Med 290(11):616-7, 14 Mar 74

AU- Weddell JM
TI- Registers and registries: a review.
SO- Int J Epidemiol 2(3):221-8, Autumn 73

AU- Ing MR ; Pang SW
TI- The racial distribution of strabismus. A statistical study.
SO- Hawaii Med J 33(1):22-3, Jan 74

AU- Siegel M
TI- Congenital malformations following chickenpox, measles, mumps, and hepatitis. Results of a cohort study.
SO- JAMA 226(13):1521-4, 24 Dec 73

AU- Mann I
TI- Eskimos and eye disease.
SO- Trans Ophthalmol Soc NZ 25:17-8, 1973

AU- Lessler K
TI- Some considerations pertinent to the health screening of children. The responsibility of pediatrics is much more than biological.
SO- Clin Pediatr (Phila) 12(11):656-9, Nov 73

AU- Bettman JW Jr
TI- Eye disease among American Indians of the Southwest. II. Trachoma.
SO- Arch Ophthalmol 90(6):440-6, Dec 73

AU- Boone WB ; Doughman DJ ; Harris JE
TI- Ophthalmia neonatorum. Value of prophylactic treatment.
SO- Minn Med 56(11):940-3, Nov 73

AU- Hall RL
TI- Authropometric and genetic studies in a Russian Old Believer population.
SO- Hum Hered 23(2):113-22, 1973

AU- McKinlay KT ; Cohen DN
TI- Modern concepts in ophthalmic casualty management.
SO- Ann Ophthalmol 5(11):1221-5 passim, Nov 73

AU- Sprague JB ; Hierholzer JC ; Currier RW 2d ; Hattwick MA ; Smith MD
TI- Epidemic keratoconjunctivitis. A severe industrial outbreak due to adenovirus type 8.
SO- N Engl J Med 289(25):1341-6, 20 Dec 73

AU- Farr HW ; Gray GF Jr ; Vrana M ; Panio M
TI- Extracranial meningioma.
SO- J Surg Oncol 5(5):411-20, May 73

AU- Hatfield EM
TI- Estimates of blindness in the United States.
SO- Sight Sav Rev 43(2):69-80, Summer 73

AU- Bunner RT
TI- Ohio's comprehensive vision project.
SO- Sight Sav Rev 43(2):113-9, Summer 73

AU- Beale HL ; Wood TO
TI- Observations on traumatic hyphema.
SO- Ann Ophthalmol 5(10):1101-4, Oct 73

AU- Clarke PE
TI- A comparative analysis of the [illegible] distribution and types of primary glaucoma among populations of African and Caucasian origins.
SO- Ann Ophthalmol 5(10):1055-71, Oct 73

000096

TI- Editorial: The diabetic retinopathy study.
SO- Arch Ophthalmol 90(5):347-8, Nov 73

AU- Bijsterveld OP van
TI- Host-parasite relationship and taxonomic position of Moraxella and morphologically related organisms.
SO- Am J Ophthalmol 76(4):545-54, Oct 73

AU- Helps EP
TI- Physiological effects of ageing.
SO- Proc R Soc Med 66(8):815-8, Aug 73

AU- Hoshiwara I ; Kronfeld PC
TI- [Current status of trachoma in the Navajo Indian]
SO- Ber Dtsch Ophthalmol Ges 71:599-601, 1972

AU- Sloan PG
TI- External diseases of the eye.
SO- Am J Optom 50(4):331-40, Apr 73

AU- Cohen J ; Pollan S
TI- A comparative clinical and microscopic study of conjunctivae among institutionalized aged.
SO- Am J Optom 50(5):399-404, May 73

TI- Diabetic retinopathy study.
SO- Am J Ophthalmol 76(3):403-5, Sep 73

TI- Profile of blind persons.
SO- Stat Bull Metropol Life Ins Co 54:9-12, Jul 73

AU- Shaw EB
TI- Gonorrheal ophthalmia neonatorum.
SO- Pediatrics 52(2):281-2, Aug 73

AU- Nolan GH ; Osborne N
TI- Gonococcal infections in the female.
SO- Obstet Gynecol 42(1):156-64, Jul 73

AU- Dresser AC ; Meirowsky AM ; Weiss GH ; McNeel ML ; Simon GA
AU- Caveness WF
TI- Gainful employment following head injury. Prognostic factors.
SO- Arch Neurol 29(2):111-6, Aug 73

AU- Fraunfelder FT ; Hanna C
TI- Spherodial degeneration of cornea and conjunctiva. 3. Incidences, classification, and etiology.
SO- Am J Ophthalmol 76(1):41-50, Jul 73

AU- Ganley JP ; Comstock GW
TI- Benign nevi and malignant melanomas of the choroid.
SO- Am J Ophthalmol 76(1):19-25, Jul 73

AU- Kann HA
TI- An extraordinary opportunity.
SO- Am J Ophthalmol 76(1):164-5, Jul 73

AU- Keller AZ
TI- Histology, survivorship and related factors in the epidemiology of eye cancers.
SO- Am J Epidemiol 97(6):386-93, Jun 73

AU- Spector M
TI- Electronstagmography after stapedectomy.
SO- Ann Otol Rhinol Laryngol 82(3):374-7, May-Jun 73

000208

AU- Alter M ; Good J ; Okihiro M
TI- Optic neuritis in Orientals and Caucasians.
SO- Neurology (Minneap) 23(6):631-9, Jun 73

AU- Sassoon HF
TI- Blue vision in children. What is the clinical significance of diminished acuity?
SO- Clin Pediatr (Phila) 12(6):351-4, Jun 73

AU- Ellis FD ; Schlaegel TF Jr
TI- The geographic localization of presumed histoplasmic choroiditis.
SO- Am J Ophthalmol 75(6):953-6, Jun 73

AU- Forsius H ; Eriksson A
TI- The cornea at northern latitudes--corneal power, arcus senilis and corneal scars in Eskimos, Lapps and Finns.
SO- Can J Ophthalmol 8(2):280-5, Apr 73

AU- Forsius H ; Lukkka H
TI- Pseudoexfoliation of the anterior capsule of the lens in Lapps and Eskimos.
SO- Can J Ophthalmol 8(2):274-7, Apr 73

AU- Alsbirk PH ; Forsius H
TI- Anterior chamber depth in Eskimos from Greenland, Canada (Igloolik) and Alaska (Wainwright). A preliminary report.
SO- Can J Ophthalmol 8(2):265-9, Apr 73

AU- Wan TT ; Wright A
TI- Occupational differentials in chronic disability.
SO- J Occup Med 15(6):493-500, Jun 73

AU- Lampe JM ; Doster AE ; Beal BB
TI- Summary of a three-year study of academic and school achievement between color-deficient and normal primary age pupils: phase two.
SO- J Sch Health 43(5):309-11, May 73

000033

AU- Gunderman JR ; Stamler R
TI- Neuropsychological residuals seven years after acute encephalitis. Results of a seven-year follow-up study of 21 children.
SO- Clin Pediatr (Phila) 12(4):228-30, Apr 73

AU- Marlor RL ; Blais BR ; Preston FR ; Boyden DG
TI- Foveomacular retinitis, an important problem in military medicine: epidemiology.
SO- Invest Ophthalmol 12(1):5-16, Jan 73

AU- Moore WS ; Wick RL Jr ; Billings CE
TI- Five year study of general aviation physical examinations.
SO- Aerosp Med 44(1):78-9, Jan 73

AU- Furszyfer J ; Kurland LT ; McConahey WM ; Woolner LB ; Elveback LR
TI- Epidemiologic aspects of Hashimoto's thyroiditis and Graves' disease in Rochester, Minnesota (1935-1967), with special reference to temporal trends.
SO- Metabolism 21(3):197-204, Mar 72

AU- Ganley JP ; Smith KE ; Thomas DB ; Comstock GW ; Sartwell PE
TI- Booster effect of histoplasmin skin testing in an elderly population.
SO- Am J Epidemiol 95(2):104-10, Feb 72

AU- Kurtzke JF ; Kurland LT ; Goldberg ID
TI- The numerical impact of the major neurologic and sense organ disorders.
SO- Trans Am Neurol Assoc 96:265-7, 1971

AU- Hoshiwara I ; Powers DK ; Krutz G
TI- Comprehensive trachoma control program among the southwestern American Indians.
SO- Rev Int Trach 47(1):53-64, 1971

GU0210

AU- Walker ML ; Becklund WW
TI- Occurrence of a cattle eyeworm, Thelazia gulosa (Nematoda: Thelaziidae), in an imported giraffe in California and T. lacrymalis in a native horse in Maryland.
SO- J Parasitol 57(6):1362-3, Dec 71

AU- Percy AK ; Nobrega FT ; Kurland LT
TI- Optic neuritis and multiple sclerosis. An epidemiologic study.
SO- Arch Ophthalmol 87(2):135-9, Feb 72

AU- Cotlier E
TI- Aphakic flat anterior chamber. II. Effect of spontaneous reformation and medical therapy.
SO- Arch Ophthalmol 87(2):124-34, Feb 72

AU- Barrett-Connor E
TI- Gonorrhea and the pediatrician.
SO- Am J Dis Child 125(2):233-8, Feb 73

AU- Snowe RJ ; Wilfert CM
TI- Epidemic reappearance of gonococcal ophthalmia neonatorum.
SO- Pediatrics 51(1):110-4, Jan 73

AU- Potts AM
TI- Treatment of amblyopia. Amblyopia therapy in an underdeveloped area.
SO- Isr J Med Sci 8(8):1474-5, Aug-Sep 72

AU- Smith RH ; Ganley JP
TI- Ophthalmic survey of a community. 1. Abnormalities of the ocular fundus.
SO- Am J Ophthalmol 74(6):1126-30, Dec 72

AU- Schober H ; Sommer K
TI- [Nonbreakable eyeglasses]
SO- Klin Monatsbl Augenheilkd 161(2):165-74, Aug 72

AU- Hollander CS ; Mitsuma T ; Shenkman L ; Stevenson C ; Pineda G
AU- Silva F
TI- T3 toxicosis in an iodine-deficient.
SO- Lancet 2(790):1276-8, 16 Dec 72

AU- Mann I
TI- Eye disease in the Eskimo and in the Australian Aboriginal: a brief comparison.
SO- Acta Ophthalmol (Kbh) 50(4):543-8, 1972

AU- Renick PA
TI- The prevalence of corrective lenses among black and white junior high school students.
SO- Am J Optom 49(11):942-4, Nov 72

AU- Wright FH ; Blough RR ; Chamberlin A ; Ernest T ; Halstead WC
AU- Meier P ; Moore RY ; Naunton RF ; Newell FW
TI- A controlled follow-up study of small prematures born from 1952 through 1956.
SO- Am J Dis Child 124(4):506-21, Oct 72

AU- Thaler JS ; Goldberg SA
TI- A vision census and study of a U.S. Veterans Administration hospital for psychiatric patients.
SO- Am J Optom 49(9):796-800, Sep 72

AU- Barry WE ; Tredici TJ
TI- Keratoconus in USAF flying personnel.
SO- Aerosp Med 43(9):1027-30, Sep 72

AU- Brunswick AF ; Josephson [illegible]
TI- Adolescent health in Harlem.
SO- Am J Public Health 62:Suppl 2:1-62, Oct 72

00212

AU- Weiss NS
TI- Relation of high blood pressure to headache, epistaxis, and selected other symptoms. The United States Health Examination Survey of Adults.
SO- N Engl J Med 287(13):631-3, 28 Sep 72

AU- Campbell CJ ; Rittler MC
TI- Cataract extraction in the retinal detachment prone patient.
SO- Trans Am Ophthalmol Soc 60:47-62, 1971

AU- Keeney AH ; Fintlemann EW ; Estlow BR
TI- Refractive correction and associated factors in spectacle glass injuries.
SO- Trans Am Ophthalmol Soc 60:321-35, 1971

AU- Scanlon J ; Roberts J
TI- Color vision deficiencies in children.
SO- Vital Health Stat 11(118):1-34, Aug 72

AU- Hatfield EM
TI- Blindness in infants and young children.
SO- Sight Sav Rev 42(2):69-89, Summer 72

AU- Pearce RL ; Reed DR ; Hofstetter HW
TI- Optometric data characteristics of male prison inmates.
SO- Am J Optom 49(8):661-72, Aug 72

AU- Kahn HA
TI- The prevalence of chronic simple glaucoma in the United States.
SO- Am J Ophthalmol 74(2):355-9, Aug 72

AU- Bettman JW Jr
TI- Eye disease among American Indians of the Southwest. I. Overall analysis.
SO- Arch Ophthalmol 88(3):263-8, Sep 72

000213

AU- Appleton B ; McCrossan GC
TI- Microwave lens effects in humans.
SO- Arch Ophthalmol 88(3):259-62, Sep 72

AU- Roberts J
TI- Eye examination findings among children. United States.
SO- Vital Health Stat 11(115):1-47, Jun 72

AU- Keeney AH ; Fintelmann K ; Estlow B
TI- Refractive correction and associated factors in spectacle glass injury.
SO- Arch Ophthalmol 88(1):2-8, Jul 72

AU- Mules J ; Henderson M ; Kuller L
TI- A population survey of symptoms suggestive of transient ischemic attacks.
SO- Stroke 2(2):114-27, Mar-Apr 71

AU- Lyle WM ; Grosvenor T ; Dean KC
TI- Corneal astigmatism in Amerind children.
SO- Am J Optom 49(6):517-24, Jun 72

AU- Odland LT
TI- Observations on microwave hazards to USAF personnel.
SO- J Occup Med 14(7):544-7, Jul 72

AU- Edwards WC ; Lawwill T
TI- Genetic and environmental factors in ophthalmic practice.
SO- J Ky Med Assoc 70(6):457-62, Jun 72

AU- Harris GA
TI- The identification of deaf-blind school-age individuals in Michigan.
SO- Am Ann Deaf 117(3):386-8, Jun 72

000214

AU- Rengstorff RH
TI- Spectacles and contact lenses: a survey of military trainees.
SO- Milit Med 137(1):13-4, Jan 72

AU- Tanabe U ; Nakajima A ; Akamatsu T ; Sugimachi Y ; Futemma M
TI- [The comparison of visually handicapped in Okinawa and Tokyo]
SO- Acta Soc Ophthalmol Jap 75(12):2222-33, 10 Dec 71

AU- Smith-Gill SJ ; Richards CM ; Nace GW
TI- Genetic and metabolic bases of two "albino" phenotypes in the leopard frog, Rana pipiens.
SO- J Exp Zool 180(2):157-67, May 72

AU- Luntz MH
TI- Glaucoma and ocular hypertension.
SO- S Afr Med J 46(10):243-5, 4 Mar 72

AU- Orenstein AM ; Anderson DP ; Stein JJ
TI- Choroid metastasis.
SO- Cancer 29(4):1101-7, Apr 72

AU- Roberts J ; Duyan KR
TI- Binocular visual acuity of children: demographic and socioeconomic characteristics-United States.
SO- Vital Health Stat 11(112):1-33, Feb 72

AU- Keeney AH
TI- Estimating the incidence of spectacle lens injuries.
SO- Am J Ophthalmol 73(2):289-91, Feb 72

AU- Smith KE ; Ganley JP
TI- Presumed ocular histoplasmosis. I. Histoplasmin skin test sensitivity in cases identified during a community survey.
SO- Arch Ophthalmol 87(3):245-50, Mar 72

000215

AU- Roberts SR ; Helper LC
TI- Cataracts in Afghan hounds.
SO- J Am Vet Med Assoc 160(4):427-32, 15 Feb 72

AU- Evans JR ; Wachs H ; Borger JM
TI- A survey of visual skills of institutionalized retarded patients.
SO- Am J Ment Defic 76(5):555-60, Mar 72

AU- Sanders JL
TI- Quantitative guidelines for communicable disease control programs.
SO- Biometrics 27(4):883-93, Dec 71

AU- Thompson L ; Luby JP ; Barnett JA ; Dewlett HJ ; Vandersloot J
AU- Reavis LD ; Reagan SC
TI- Survey of a medically indigent population in South Dallas, Texas, 1969.
SO- HSMHA Health Rep 86(11):981-9, Nov 71

AU- Haber LD
TI- Disabling effects of chronic disease and impairment.
SO- J Chronic Dis 24(7):469-87, Sep 71

AU- Maloney PF ; Abbott MH ; White ED ; Abbey H
TI- A survey of heritable disorders in Maryland.
SO- Md State Med J 19(6):43-9, Jun 70

AU- Hansen AC
TI- Comparative ophthalmology: black and white.
SO- J Natl Med Assoc 63(6):445-9, Nov 71

AU- Priester WA ; Mantel N
TI- Occurrence of tumors in domestic animals. Data from 12 United States and Canadian colleges of veterinary medicine.
SO- J Natl Cancer Inst 47(6):1333-44, Dec 71

000218

AU- Salvia J ; Ysseldyke J
TI- The Dvorine color blindness test with retarded boys.
SO- Except Child 38(3):263-4, Nov 71

AU- Chase HP ; Kumar V ; Dodds JM ; Sauberlich HE ; Hunter RM
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APPENDIX E

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APPENDIX F

BACKGROUND INFORMATION OF EXISTING DATA SOURCES

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F.1 BLINDNESS REGISTERS

1.1 Definitions

Definitions of the following terms were standardized for use by each of the state blindness registers in the Model Reporting Area for Blindness Statistics (established in 1962 by the National Institute of Neurological Diseases and Blindness, and discontinued in 1971): visual acuity (subdivided into seven vision groups), visual field, blind, affection, etiology, age as of a given date, age when blinded, color/sex, MRA, register, registered person's record, addition to register, new addition to register, readdition to register, gross addition to register, removal from register, net addition to register, blindness incidence, register prevalence, blindness prevalence, blindness rate.[1] While the above terms are defined in the 1967 MRA report, definitions were applicable to the 1969-70 data, from which data were taken for this report.

1.2 Classifications

In order to meet the need for statistical standardization within the state registers participating in the Model Reporting Area (MRA), the Standard Classification of Causes of Severe Vision Impairment and Blindness was developed by the Sub-committee on Operational Research, National Society for the Prevention of Blindness (NSPB). This classification was required for all member MRS blindness registers.

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[1] U.S. Department of Health, Education and Welfare: "Statistics for 1967 on Blindness in the Model Reporting Area," pages 2-3.

STANDARD CLASSIFICATION OF CAUSES OF SEVERE VISION IMPAIRMENT AND BLINDNESS

1966 REVISION

I. CLASSIFICATION BY SITE AND TYPE OF AFFECTION

EYEBALL IN GENERAL

110 Glaucoma. Subdivided:
- 111 Glaucoma, open angle
- 112 Glaucoma, closed angle
- 113 Glaucoma, type not specified

115 Hydrophthalmos
120 Microphthalmos
125 Anophthalmos, congenital
130 Albinism
140 Myopia
141 Other refractive error
147 Multiple congenital ocular malformations
150 Panophthalmitis, endophthalmitis
155 Atrophic globe
190 Other affection of eyeball

CORNEA, SCLERA

310 Keratoconjunctivitis
311 Interstitial keratitis
314 Scleritis
315 Pannus
318 Other keratitis
330 Keratomalacia
340 Other corneal dystrophy
370 Keratoconus
390 Other affection of cornea or sclera

LENS

410 Cataract. Subdivided:
- 411 Cataract, unoperated
- 412 Cataract, operated
- 413 Cataract, no report concerning operation

420 Dislocated lens
490 Other affection of lens

UVEAL TRACT

510 Uveitis, iritis, iridocyclitis, choroiditis
520 Chorioretinitis
530 Choroidal degeneration
570 Sympathetic ophthalmia
575 Absence of iris, congenital
590 Other affection of iris, ciliary body or choroid

RETINA

610 Retinitis
615 Retinopathy
630 Retrolental fibroplasia
640 Detachment of retina
650 Retinitis pigmentosa
660 Macular degeneration
670 Other retinal degeneration
690 Other affection of retina

OPTIC NERVE, OPTIC PATHWAY, VISUAL CENTER, OCULOMOTOR CENTERS

710 Optic neuritis, including retrobulbar neuritis
720 Optic nerve atrophy
725 Coloboma of optic nerve, congenital
730 Other affection of optic nerve
750 Other affection of optic pathway or visual center
770 Nystagmus

VITREOUS

810 Vitreous hemorrhage
890 Other affection of vitreous

SITE AND TYPE INDEFINITE OR NOT REPORTED

915 Amblyopia
950 Multiple affections reported without indication of priority as to cause of severe vision impairment. Subdivided:
- 951 Glaucoma and cataract without mention of retinal affection, any type, with or without other affection
- 952 Glaucoma and retinal affection, any type, without mention of cataract, with or without other affection
- 953 Cataract and retinal affection, any type, without mention of glaucoma, with or without other affection
- 954 Glaucoma, cataract, and retinal affection, any type, with or without other affection
- 955 Glaucoma in any other combination
- 956 Cataract in any other combination
- 957 Retinal affection, any type, in any other combination
- 979 All other

990 Site and type of affection not established on examination or not reported

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II. CLASSIFICATION BY ETIOLOGY

INFECTIOUS DISEASES

11.00 Diphtheria
12.00 Fungus infection
13.00 Gonorrhea
14.00 Herpes simplex
14.50 Herpes zoster
15.00 Measles
16.00 Meningococcal infection
17.00 Onchocerciasis
18.00 Rubella
19.00 Scarlet fever
20.10 Syphilis, specified as prenatal
20.20 Syphilis, other
21.10 Toxoplasmosis, specified as prenatal
21.20 Toxoplasmosis, other
22.00 Trachoma
23.00 Tuberculosis
24.00 Leprosy
28.10 Other identified infectious disease, specified as prenatal
28.20 Other identified infectious disease
29.10 Unidentified infectious disease, specified as prenatal
29.20 Unidentified infectious disease, other

INJURIES, POISONINGS

A. Causal activity

31. Occupational activity
32. Military activity
33. Household activity
34. Recreational activity
35. Transportation, Traffic
36. Birth process
37. Surgical or medical procedure
38. Act of violence
39. Prenatal event
48. Other causal activity specified
49. Causal activity not specified or no specific causal activity

B. Causal agent

.01 Chemical causing burn
.03 Radiation, including radiant heat
.04 Firearm
.05 Fireworks
.06 Other explosive
.07 Airgun or slingshot
.08 Blow or fall
.09 Foreign body in eye
.11 Methyl alcohol
.12 Lead
.13 Oxygen
.14 Quinine
.15 Other toxic agent
.18 Other nontoxic agent
.19 Causal agent not specified or no specific causal agent

NEOPLASMS

51.00 Retinoblastoma
52.00 Melanoma, malignant
53.00 Phakomatosis
56.00 Neoplasm of pituitary gland or stalk
57.00 Other intracranial neoplasm
59.00 Other neoplasm

DISEASES OR DISORDERS NOT ELSEWHERE CLASSIFIED

61.00 Anemia or other blood disease
62.10 Diabetes mellitus
62.20 Senile degeneration. Subdivided:
  62.21 Senile degeneration indicated by reported diagnosis
  62.22 Senile degeneration assumed from age and other reported data
62.30 Nutritional deficiency
62.90 Other metabolic or growth disorder
63.00 Renal disease other than complication of pregnancy
64.10 Cerebrovascular condition
64.90 Other disease of the circulatory system
65.10 Multiple sclerosis
65.20 Other demyelinating disease
65.90 Other disease of the central nervous system
66.00 Psychogenic disorder
67.00 Complication of pregnancy
68.00 Sarcoidosis
69.00 Noninfectious inflammatory disease
78.00 Other specified disease or disorder not elsewhere classified

PRENATAL INFLUENCE NOT ELSEWHERE CLASSIFIED

80.00 Hereditary origin probable or possible. Subdivided:
  80.10 Hereditary origin probable or possible, occurrence in genetic family reported
  80.20 Hereditary origin probable or possible, occurrence in genetic family not reported
89.00 Congenital origin not elsewhere classified

ETIOLOGY INDEFINITE OR NOT REPORTED

91.00 Unknown to science
95.00 Multiple etiologies for cases of multiple affections included in site and type categories 950-979. Subdivided:
  95.01 Senile degeneration and diabetes mellitus, with or without other etiology
  95.02 Senile degeneration and other etiology except diabetes mellitus
  95.03 Diabetes mellitus and other etiology except senile degeneration
  95.99 All other
99.00 Etiology not established on examination or not reported

National Society for the Prevention of Blindness, Inc.
79 Madison Avenue, New York, N. Y. 10016

000276

The Standard Classification consists of two parts: (1) a three-digit numerical code for site or type of affection which indicates the specific part of the eye affected or the nature of the affection or impairment and (2) a four-digit numerical code for the etiology or underlying cause of affection.

In his description of the NSPB Standard Classification, Dr. Hyman Goldstein notes the following: "the cause of impairment is assigned, insofar as possible, to the primary vision-impairing affection and its etiology. This is the condition which started the chain of events leading to the severe vision impairment or blindness. The preciseness and completeness of the medical diagnosis by examining physicians determine the accuracy of the resulting statistics."[2]

1.3 Data Collection Methods

State blindness registers belonging to the MRA did not actively solicit registrants for their records but depended on "eye examiners, eye clinics, hospitals, homes for the aged, nursing homes, friends of the blind and the blind themselves"[3] to report blind persons to the registers.

1.4 Response Rate

The principal weakness of the MRA data lies in the "incomplete registration of blind persons and probable variability

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[2] Hyman Goldstein, Ph.D.: "Incidence, Prevalence and Causes of Blindness in Selected Countries," p.46, reprinted from Public Health Reviews, 1:41-69, 1972

[3] U.S. Department of Health, Education, and Welfare: "Statistics for 1967 on Blindness in the Model Reporting Area," p.1.

in degree of completeness among states, racial groups, age classes, diagnostic categories, etc."[4]

There are no data available on the actual percentage of unregistered cases by states participating in the MRA as of 1970, although it is believed that the number of unreported cases of blindness and severe visual disorders was substantial.[5] Since blindness registers depend on other sources for adding new cases to the register, no assurance can be given that all cases of blindness or severe visual impairment have been reported to the register by those sources or that the sources have access to a true total of potential registrants.

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[4] U.S. Department of Health, Education, and Welfare: "Statistics on Blindness in the Model Reporting Area, 1969-70," page 4.

[5] Ibid., page 4.

000278

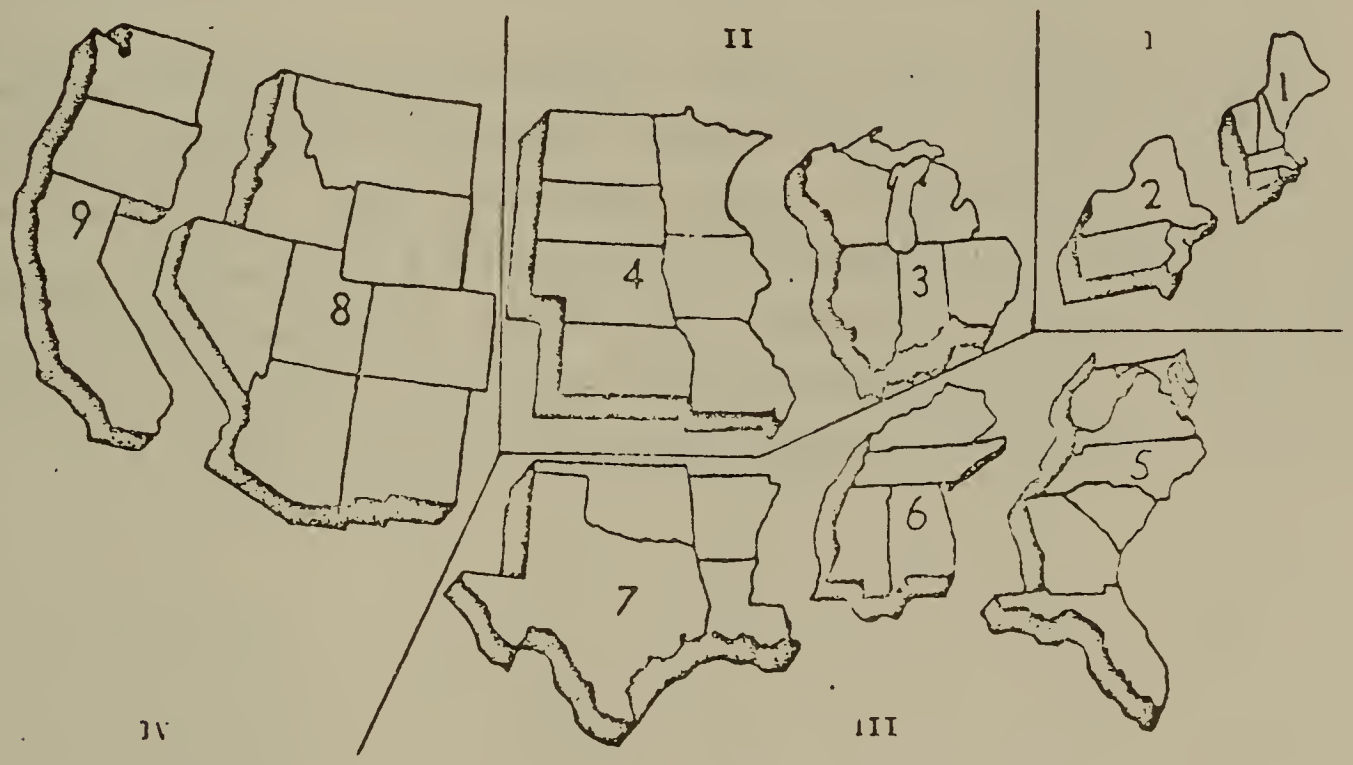
F.2 NATIONAL DISEASE AND THERAPEUTIC INDEX*

The National Disease and Therapeutic Index (NDTI) is a continuing compilation of statistical information about patterns and treatment of disease in office-based practice in the continental United States. The service originated in 1956 and offers computerized (tape) data back to 1960.

2.1 Sample Design

Data are obtained from a representative panel of physicians who report case history information on private patients seen. Over fifteen hundred physicians are asked to report four times a year on a 48-hour period of their practice. Panel members are drawn from forty-eight states and include all physician specialties engaged primarily in private practice. Reporting periods are arranged such that all days of the week are covered.

The universe is divided into four geographical regions, combining the nine U.S. Census areas in logical groupings.



*All information has been excerpted from IMS AMERICA, LTD., "National Disease and Therapeutic Index," Ambler, Pennsylvania, 1975.

Although the nine U.S. Census regions are represented, it is preferable to avoid aggregating at this level. Since the panel is not projected by U.S. Census region, the statistical reliability of NDTI data broken down in such a manner is unknown.

All major office-based specialties are represented within the NDTI panel. The representation is based on proportionality as well as measured differences in variability regarding patient load, diagnoses treated, and drug utilization. Smaller specialties are, however, oversampled to allow greater reliability in these areas. Projection factors are adjusted to compensate for this oversampling; that is, while the specialties are over-sampled they are not over-projected.

There are a total of four regions and 19 specialties which form a 76 region/specialty cell matrix or strata. Within each cell the projection factor is derived by dividing the universe of physicians' days by the sample number of reporting days. This results in an average projection factor of between 5,000 and 5,500. The table on page 9 shows the targeted sample size for each of the 76 cells.

Panel members are rotated to provide additional reliability in that a cross-section of the medical profession will be assured. No physician participates for longer than one year. The average participant reports on a total of 4.2 days of his practice annually. Once a physician leaves the panel, he is not recontacted for a minimum of two years. Computerized random selection techniques provide a statistically valid mix by physician age and area size.

000280

NDTI Targeted Monthly Sample

NDTI MONTHLY SAMPLE

	REGION				TOTAL
	1	2	3	4	
GENERAL PRACTITIONERS	25	31	33	24	113
INTERNISTS	22	15	18	15	70
CARDIOLOGISTS	3	3	2	2	10
GASTROENTEROLOGISTS	2	2	2	2	8
PSYCHIATRISTS	8	5	6	6	25
NEUROLOGISTS	2	2	2	2	8
OB/GYN	9	8	10	6	33
ENT	2	2	3	2	9
OPHTHALMOLOGISTS	8	6	9	7	30
GENERAL SURGEONS	10	8	10	6	34
ORTHOPEDIC SURGEONS	3	3	3	2	11
COLON & RECTAL SURGEONS	1	1	1	1	4
ALL OTHER SURGEONS	2	2	2	2	8
PEDIATRICIANS	8	7	8	5	28
UROLOGISTS	3	2	3	2	10
DERMATOLOGISTS	4	3	2	2	11
ALLERGISTS	2	2	2	2	8
PART-TIME SPECIALISTS	13	15	14	10	52
OSTEOPATHIC PHYSICIANS	8	12	5	3	28
TOTAL	135	129	135	101	500

2.1.1 Sampling Plan

In the language of sampling practice, NDTI uses a stratified random sample with subsampling from units of equal size. These terms can be clarified as follows:

- Stratification: The 72 region-specialty cells supply the stratification spoken of previously. A sample of physicians, consisting of a little less than 1 percent of the universe, is drawn at random and independently for each one of these strata. Due to a slightly lower physician response rate in the East and Midwest, these areas are sampled at a somewhat higher rate in order to insure a more representative regional distribution in the final sample returns. Furthermore, a constant sampling fraction of less than 1 percent would lead essentially to a sample size of zero in some of the small strata. In such cases, an effort is made to sample at least one physician.

  This system of stratification has a number of advantages. First of all, it takes advantage of the tendency for physicians with the same specialty and within the same region to be more alike than physicians in the universe as a whole. More importantly, it provides several types of estimates. Thus in addition to the over-all national estimate, it can provide an estimate for any single region-specialty cell or for any single region-specialty cell or for any desired combination of cells.

- Subsampling from units of equal size: Although a sample of physicians is drawn, the item of actual interest is the practice of any physician for an entire quarter of the year. This period of his practice is the primary sampling unit and is of equal size for all physicians. However, it is obviously impossible to obtain information for an entire quarter. Therefore, each sampled physician is asked to supply information on a subsample consisting of a 48-hour period of his practice. These reporting periods are scheduled in such a manner as to provide information for every day of the year. This means that the sample data include an equal number of Saturdays, Sundays and holidays,

including a representative number of physician vacation days. Because of this scheduling, estimates can be supplied for each individual month of a given quarter, as well as for the entire quarter.

The sample drawn by this procedure consists of 1,500 physicians in private practice throughout the United States. Each sampled physician is asked to report information on private patient visits for only a 48-hour period. Although each physician is expected to participate in the study for four consecutive quarters, there are inevitable dropouts. Thus a portion of the sample is drawn anew each quarter. For the purpose of estimating sampling errors the sample of physicians in each quarter is treated as a completely new sample.

2.1.2 Expansion of Sample Data to the Total Universe

The estimate of the total number of mentions of a drug or diagnosis, for example, in the universe of a particular region-specialty cell is given by the following formula:

$$Yij = \frac{Nij\ T}{2\ nij}\ yij,$$

Where the subscripts i and j refer to the ith specialty and jth region respectively, Yij is the estimated number of mentions in the universe of the ijth region-specialty cell, Yij is the total number of mentions reported in the sample from this cell, Nij is the total number of physicians in the ijth region-specialty cell, nij is the total number of physicians in the sample from this cell and T is the number of days for which the estimate is to apply.

In practice, T will be the number of days in the month for which estimates are being made. The estimates for any quarter are then obtained by adding up the estimates for the three months within that quarter. The factor of 2 enters into the formula because each physician reports for a two-day period.

000283

The factor

$$\frac{Nij\ T}{2\ nij}$$

is known as the projection factor for the ijth cell and is constant in that cell for all variables reported in the study. For example, if there are 4,085 general practitioners in Region I and 15 of these report in the month of January, the appropriate projection factor is:

$$\frac{4,085 \times 31}{2 \times 15} = 4,221+$$

This factor of 4,221 is then used to project all diagnosis and drug mentions appearing in the reports from general practitioners in Region I, by simply multiplying the factor by the reported number of mentions.

Given such an estimate for each region-specialty cell, the national estimate is obtained by simply adding all of the cell estimates. In practice, the appropriate projection factor appears on the card for each patient reported. Therefore to obtain any estimate it is only necessary to sort out all of the cards containing the desired mentions and simply add up their projection factors.

2.2 Data Collection Methodology

On the following page is an example of the document which each panel member completes for each private patient seen during his 48-hour reporting period. Note that identification of the physician and the patient is avoided, beyond the demographics.

Sample Physician Form

DIAGNOSIS #1 (for reason for visit) OBESITY

SURGICAL PROCEDURE THIS VISIT, IF ANY _____

FOR THIS DIAGNOSIS ONLY

1) REFERRED BY OTHER PHYS - YES [ ] NO [X]

2) SEEN BEFORE YES [X] NO [ ]

3) IF YES # TIMES SEEN IN LAST 12 MONTHS 4

DAYS SINCE LAST VISIT 30

PATIENT DATA

AGE: 43 YRS _____ MOS (For Infants)

SEX: MALE [X] FEMALE [ ]

PATIENT CONTACTED

IN OFFICE [X] HOUSE CALL [ ] IN HOSPITAL

OTHER [ ] BY TELEPHONE [ ] NURSING HOME [ ]

THERAPY FOR DIAGNOSIS #1

	DRUG THERAPY— (Record all Drug and Vitamin names exactly as issued)	DOSAGE FORM	STRENGTH	SIGNA	ACTION DESIRED (Also Specify If Pre/Post Op Use)	THERAPY:	ISSUANCE
#1	SANOREX	TAB	1MG.	T.I.D.	WEIGHT REDUCTION	[ ] STARTED THIS VISIT [X] PREVIOUSLY ORDERED AND CONTINUED	[ ] STOCK DISPENSED [ ] GAVE SAMPLE [X] SIGNED OR PHONED R. [ ] RECMD TO PATIENT [ ] HOSPITAL ORDER
#2						[ ] STARTED THIS VISIT [ ] PREVIOUSLY ORDERED AND CONTINUED	[ ] STOCK DISPENSED [ ] GAVE SAMPLE [ ] SIGNED OR PHONED R. [ ] RECMD TO PATIENT [ ] HOSPITAL ORDER
#3						[ ] STARTED THIS VISIT [ ] PREVIOUSLY ORDERED AND CONTINUED	[ ] STOCK DISPENSED [ ] GAVE SAMPLE [ ] SIGNED OR PHONED R. [ ] RECMD TO PATIENT [ ] HOSPITAL ORDER

OTHER THERAPY THIS VISIT [ ] DRESSING BANDAGE [X] DIET [ ] PHYSICAL THERAPY [ ] PSYCHOTHERAPY [ ] OTHER (Specify) _____

As indicated by the table presented below, physicians are fairly conscientious in providing the requested data.

NDTI COMPLETION RATE

PATIENT AGE	99%
SEX	98%
LOCATION	95%
DIAGNOSIS	100%
DRUG NAME	99%
VISIT	95%
REFERRAL	97%
SURGERY	99%
THERAPY	89%
ISSUANCE	88%
HOW OFTEN SEEN TIME SINCE LAST VISIT	APPROX. 2/3 OF THE TIME

000285

Except for the last two variables listed, the completion rate is very high. "How Often Seen" and "Time Since Last Visit" involves the checking of patient records on the part of the physician and thus is "overlooked" more often than others.

Consistency in quarter-to-quarter and year-to-year NDTI data provides direct, empirical evidence of the reliability of the overall measurement process. In addition, the statistical error margins arising from taking a sample instead of a complete canvass have been rigorously calculated. For example, an NDTI estimate of 2 million drug uses per year has relative "Standard Error" of 8.8 percent. This means the chances are 68 percent that the true figure is between 1.82 and 2.18 million, and the chances are 95% that the true figure is between 1.65 and 2.35 million. Sampling error margins for all sizes of NDTI estimates (an example is provided below) and explanation of their derivation are available.

Sampling Error Margins for NDTI Estimates

Yearly National Estimate (000)	STANDARD ERROR AS % OF NATIONAL ESTIMATE	
	One Standard Deviation (68% Level)	Two Standard Deviations (95% Level)
800	± 12.6	± 25.2
900	± 12.0	± 24.0
1,000	± 11.5	± 23.0
2,000	± 8.8	± 17.6
3,000	± 7.4	± 14.8
4,000	± 6.6	± 13.2
5,000	± 6.1	± 12.2
6,000	± 5.6	± 11.2
7,000	± 5.4	± 10.8
8,000	± 5.0	± 10.0

000286

THE N.D.T.I. UNIVERSE

NUMBER OF OFFICE BASED PHYSICIANS

BY SPECIALTY AND REGION

TYPE OF PRACTICE	EAST	MIDWEST	SOUTH	WEST	TOTAL	%
General Practice	7,136	8,883	9,385	6,847	32,251	18
STARRED SPECIALISTS						
Internal Medicine	7,700	5,461	6,131	4,973	24,265	14
Cardiology	1,387	781	1,081	761	4,010	2
Gastroenterology	434	199	297	207	1,137	1
Psychiatry	4,340	2,183	2,725	2,580	11,828	7
Neurology	429	284	344	341	1,398	1
Obstetrics/Gynecology	4,028	3,217	4,168	2,799	14,212	8
Ear, Nose & Throat	1,134	851	1,165	870	4,020	2
* Ophthalmology	2,169	1,845	2,211	1,734	7,959	4
General Surgery	4,816	4,449	5,216	3,252	17,733	10
Orthopedic Surgery	1,760	1,524	1,990	1,835	7,109	4
All Other Surgery*	1,503	1,318	1,704	1,340	5,865	3
Pediatrics	3,295	2,326	3,153	2,222	10,996	6
Urology	1,161	1,091	1,457	981	4,690	3
Dermatology	868	665	809	730	3,072	2
Allergy	523	380	378	332	1,613	1
UNSTARRED SPECIALISTS	3,873	4,273	4,226	3,098	15,470	9
Obstetrics/Gynecology	505	545	600	365	2,015	1
Surgery	797	1,639	1,658	1,221	5,315	3
All Others	2,571	2,089	1,968	1,512	8,140	5
Total MDs	46,556	39,730	46,440	34,902	167,628	95
Osteopathy	2,622	4,118	1,959	991	9,690	5
Total	49,178	43,848	48,399	35,893	177,318	100%

* Includes Proctology

000287

	12 Mos	Qtr
Est U S Visits (.000) (4)	22244	5285
Patient Visits w/Drugs	14620	3590
Patient Visits w o Drugs	7624	1695
Sample Data Total Visits (5)	4453	1048

(1) NON ENDOCRINE OBESITY
(ISC=287.01

(2) JAN 74 - DEC 74
(3) Class 0 Page

Age (6)

Age	TOTAL 12 Mos No	%	Male 12 Mos No	%	Female 12 Mos No	%	Unspec 12 Mos No
24 & Under	23	-	7	-	16	-	-
25-29	119	1	66	2	48	-	4
30-34	1306	6	263	7	1023	6	20
35-44	9559	44	1589	40	7715	45	256
45-54	8199	38	1502	38	6446	37	250
55-64	1197	5	214	5	940	5	43
65 & Over	1398	6	292	7	1080	6	27
TOTAL	21801	100	3933	100	17268	100	600
Unspec	444		48		134		262

Specialty (7)

Specialty	12 Mos No	%	Qtr %	Visits/ Phy /Yr
GP FP/PI	12350	56	57	259
Int Med	3656	16	12	151
Card	312	1	2	78
Endocr	98	-	-	86
Gen Surg	518	2	2	29
Ortho Surg	124	1	1	17
All Surg	17	-	-	3
Ob Gyn	1160	5	5	82
Peds	242	1	-	22
Psych	8	-	-	2
Opthal	18	-	-	2
Derm	18	-	-	6
Allerg	23	-	-	14
Dermatgy	18	-	-	4
Psych	93	-	1	8
Neur	4	-	-	3
Osteo	3586	16	20	370
TOTAL	22244	100	100	125

Location (8)

Location	12 Mos No	%	Qtr %
Office	18616	92	92
Home	47	-	-
Hosp	714	4	3
Telephn	605	4	4
Nursg Hm	19	-	-
Other	53	-	-
TOTAL	20256	100	100
Unspec	1989		

Region (9)

Region	12 Mos No	%	Qtr %
East	5906	27	25
Midwest	5830	26	24
South	6821	31	37
West	3686	17	14
TOTAL	22244	100	100

Visit (10)

Visit	12 Mos No	%	Qtr %
First	3921	20	18
Refer	431	11**	
Subseq	16171	80	82
TOTAL	20092	100	100
Unspec	2153		

** % of First Visits

Surgery (11)

Surgery	12 Mos No	%	Qtr %
Yes	4	-	-
No	22235	100	100
TOTAL	22239	100	100
Unspec	5		

Desired Action (15)

Desired Action	12 Mos No	%	Qtr %
APPETITE DEPRESS	5208	38	38
PRODUCE ANOREXIA	3242	24	30
WEIGHT REDUCTION	2750	20	23
DIURETIC	842	6	5
METABOLIC STIMUL	282	2	1
REDU FLUID RETEN	174	1	-
REPLACE THYROID	168	1	-
VIT MIN SUPPL	110	1	-
REDUCE SWELLING	67	-	-
TRANQUILIZER	56	-	-
WEIGHT REDUCTION & APPETITE DEPRESS	42	-	-
CONTROL EDEMA	40	-	-
SYMPTOMATIC	40	-	-
SEDATIVE NIGHT & PROMOTE SLEEP	34	-	-
NUTRITIONAL	31	-	-
WEIGHT REDUCTION & DIURETIC	29	-	-
REDU NERVOUSNESS	25	-	-
RELAXANT	21	-	-
REDUCE ANXIETY	18	-	-
INCREASE ENERGY	18	-	-
HEMATINIC	18	-	-
ANABOLIC ACTIV	18	-	1
METABOLISM AID	16	-	-
MODO ELEVATION	16	-	-
PROPHYLAXIS	15	-	-
HORMONE IMBAL	15	-	-
GENERAL TONIC	15	-	-
SEDATIVE UNSPEC	15	-	-
CORRECT K IMBAL	15	-	-
REDUCE TENSION	14	-	-
SEDATIVE NIGHT	14	-	-
ANTIDEPRESSANT	12	-	-
CNS STIMULANT	10	-	-
CNS STIMULANT & APPETITE DEPRESS	9	-	-
DIURETIC & ANTIHYPERTENSIVE	8	-	-
SEDATIVE DAY	8	-	-
ANALGESIC	7	-	-
INC CIRCULATION	6	-	-
INCREASE ENERGY & APPETITE DEPRESS	6	-	-
ANTIANEMIC	6	-	-
ANTACID	6	-	-
PSYCHOTHERAPEUT	6	-	-
OPHTHAL DECONG	6	-	-
COMBAT INFECTION	5	-	-
MAINTAIN BL PRES	5	-	-
EVACUATE BOWELS	5	-	-
VIT MIN SUPPL & GENERAL TONIC	5	-	-
REL INTRAOC PRES	5	-	-
CONTROL DIABETES	5	-	-
ANTIDEPRESSANT & APPETITE DEPRESS	5	-	-
REL LEG CRAMPS	5	-	-
INCREASE TONE	4	-	-
PRENATAL VITAMIN	4	-	-
ANTIBIOTIC	4	-	-
GI ANTISPASMODIC & DIGESTION AID	4	-	-
APPETITE STIMUL	4	-	-
LAXATIVE	4	-	-
ANTIDIARRHEAL	4	-	-
ALL OTHERS	35	-	-
TOTAL	13548	100	100
NO REASON GIVEN	5668		

Drugs (12)

	Drugs	12 Mos No	%	Qtr %
13	ALL OTH ANTIOBESITY PREP	10398	46*	81*
13006	TENUATE	1789	8	9
13007	IONAMIN	1619	7	7
13005	PHENDIMETRAZINE	1478	7	11
13003	PRELUDIN	921	4	5
1311A	SANOREX (13)	778	3	3
13008	TEPANIL	705	3	2
13120	FASTIN	415	2	2
13999	ANTIOBESITY PREP MISC	397	2	-
13110	PONDIMIN	394	2	1
13026	PLEGINE	389	2	2
13085	BACARATE	276	1	3
13111	VORANIL	258	1	-
13097	STATOBEX	235	1	-
13122	STATOBEX-D	189	1	2
13080	DIOREX	148	1	1
13117	PRETTS	92	-	-
13004	ANOREXIANT UNSPEC	82	-	-
13126	MELFIAT	60	-	1
13079	PRE-SATE	54	-	-
1312A	PHENTERMINE	28	-	-
13005	OBETROL	18	-	-
13125	IONAKRAFT	16	-	-
13000	ALTEPOSE	15	-	-
13129	PHENAZINE	10	-	-
13115	ADPHEN	10	-	-
13094	TANOREX	8	-	-
12	AMPHETAMINE PREPS	2812	13*	11*
12141	ESKATROL	705	3	3
12013	BIPHETAMINE	667	3	3
12017	DEXAMYL	363	2	2
12018	DEXEDRINE	191	1	1
12016	DESOXYN	191	1	1
12019	D AMPHETAMINE	185	1	-
12200	DELCOBESE	136	1	1
12004	AMPHETAMINE	88	-	1
12028	OBEDRIN	60	-	-
12148	BAMADEX	39	-	-
12999	AMPHETAMINE MISC	27	-	-
12014	DONTRIL	24	-	-
12109	DIPHYLET	23	-	-
12166	BIPHETAMINE T	22	-	-
12181	AMPHAPLEX	19	-	-
12197	CYDRIL TX	14	-	-
12002	AMODEX	13	-	-
12184	MAIGRET	10	-	-
12227	ADIPD	9	-	-
12161	CYDRIL	6	-	-
64	OTH HORMONES	1763	8*	9*
64004	CHORIONIC GONADOTROPIN	1686	8	8
64104	CHORIGON	70	-	-
79	DIURETICS	1618	7*	4*
79097	LASIX	318	1	2
79073	METAHYDRIN	231	1	1
79017	HYDRODIURIL	156	1	-
79087	ALDACTAZIDE	136	1	-
79061	HYGROTON	122	1	-
79070	ENDURON	117	1	-
79006	DIURIL	112	1	-
79026	ESIDRIX	102	-	-
79095	DYAZIDE	91	-	-
79015	THIOMEPIN	56	-	-
79999	DIURETICS MISC	26	-	-
79079	RENESE	23	-	-
79060	NAQUA	18	-	-
79084	ALDACTONE	14	-	-
79096	AQUATAG	14	-	-
7908A	NATURETIN	13	-	-
79102	BENZTHIAZIDE	10	-	-
79086	HYDROMOX	10	-	-
7912A	ZAROXOLYN	9	-	-
79007	MERCUHYDRIN	7	-	-
79093	BRISTURON	6	-	-
79027	HYDROCHLOROTHIAZIDE	6	-	-
79051	DRETIC	6	-	-
55	THYROID PREPS	1304	6*	8*
55010	THYROID	808	4	7
55053	THYROLAR	213	1	-
55004	PROLOID	176	1	-
5503A	SYNTHROID	46	-	-
55051	EUTHROID	13	-	-
55001	CYTOMEL	17	-	-
55018	THYROID	18	-	-
	ALL OTHERS	1123	5*	4*
(14)	TOTAL	19016	.9	.9

000288

NDTI Diagnosis Reference File

Sample Page

DIAGNOSIS

EXPLANATION OF CAPTIONS

The items below are keyed by number to the data captions on the sample diagnosis on the previous page.

1. DIAGNOSIS NAME - name of diagnosis, followed by the 7th revision, International Classification of Diseases code number.

2. REPORTING PERIOD - a 12 month moving total.

3. CLASS - diagnosis class code and subclass where indicated.

4. EST. U.S. VISITS (000) - projected patient visits for the current 12 months and quarter. This figure represents the number of contacts between patient and physician for this diagnosis. These patient visits are also distributed by those in which a drug was issued versus those without a drug.

5. SAMPLE DATA - sample patient visits on which the projections are based.

6. SEX/AGE - patient visits distributed by age of patient in total and by sex.

7. SPECIALTY - distribution of patient visits according to the specialty of the physician treating this diagnosis, as well as a calculation of visits per physician per year.

8. LOCATION - patient visits by location of patient contact.

9. REGION - patient visits distributed by 4 regions as illustrated in the N.D.T.I. Universe on Page 6.

10. VISIT/REFERRAL - the number of patient visits newly diagnosed, versus those seen before for this episode of this diagnosis. The first column of figures in each table is the actual distribution of visits in thousands for the last 12 months. The second column is the percentage of distribution for the last 12 months, while the third column is the percentage distribution of the current quarter. Also included here are the number of visits referred to the treating physician by another physician. As this pertains to first visit patients only, the percentaging is against the total number of first visits.

11. SURGERY - patient visits in which surgery was performed for this diagnosis.

12. THERAPEUTIC CLASS - the number of uses of a drug class for this diagnosis (in thousands). The 12 month and quarterly percentages at the therapeutic class level exclude double counting when a patient receives two drugs from the same therapeutic class.

    All drug classes and individual drug uses are a percentage of patient visits. Drug mentions and their percentages do not always add up to the therapeutic class total because we suppress the printing of small drugs below a cutoff point. All the computations are performed before cutting off and before rounding of the decimals.

13. SPECIFIC DRUG - distribution of leading drugs within therapeutic class, arranged in descending order.

14. TOTAL - the average number of drugs given per patient visit. Total patient visits divided by the total number of drugs.

15. DESIRED ACTION - the distribution of desired actions sought by the physicians in treating this diagnosis ranked in descending sequence.

000289

2.3 Classification

The NDTI diagnosis coding system is based on the 1955 revision of the World Health Organizations's International Classification of Diseases (Seventh Revision). Diagnoses are divided into 18 diagnosis classes, such as Diseases of the Respiratory System, Circulatory Disorders, Accidents and Injuries, etc., which are then further broken into subclasses (when appropriate) and, finally, four-digit codes. For more specificity, IMS has created a six-digit level (available from 1965), the visits for which are published annually but are always available in a special computer tabulation. An example of the coding system follows:

DIAGNOSIS REFERENCE FILE

18 CLASSES	3 DIGIT	4 DIGIT	6 DIGIT (AVAILABLE 1965 ON)
08			
DIS OF RESPIRATORY SYSTEM	CHRONIC PHARYNGITIS/ NASOPHARYNGITIS		
	512	5120	CHRONIC PHARYNGITIS
			512001 PHARYNGITIS CHRONIC
			512002 CHRONIC SORE THROAT
		5121	CHRONIC NASOPHARYNGITIS
			512101 NASOPHARYNGITIS CHRONIC NOS
			512102 NASOPHARYNG SUPPURAT CHR OR NOS
			512103 DRYNESS NOSE THROAT LARYNX
			512107 RHINITIS NOS
			512108 RHINITIS ATROPHIC
			512109 RHINITIS CHRONIC
			512115 SMOKERS THROAT
			512117 RHINITIS VASOMOTOR
			512119 CATARRHAL RHINITIS CHRON OR NOS
			512121 HYPERTROPHIC RHINITIS

000290

2.4 Response Rate

The problem of non-response exists in any sample survey of this type. At present the response rate is about 50% of all physicians contacted. A check of ascertainable variables for non-respondents (age, city-size, specialty, etc.) shows no significant difference between them and the responding physicians. This does not necessarily imply anything about the variables of major interest. However, it does give some hope that the estimates for these variables are also unbiased, even though at the present time, the actual magnitude of the non-response error cannot be accurately measured.

At the very least, the consistency found in the data over the past years indicates that year-to-year or quarter-to-quarter comparisons are quite valid. In order to make such comparisons meaningful, it is necessary to have some idea of the magnitude of the sampling error of the estimates. The sampling plan used in the N.D.T.I. survey not only makes it possible to calculate sampling errors, but also dictates the manner in which they should be calculated.

The estimated variance of the total number of mentions in a given region-specialty cell is calculated as follows:

$$\text{Var}\ (\hat{Y}) = \left(\frac{NT}{2n}\right)^2 n \ \frac{\Sigma\ (y-\bar{y})^2}{n-1}$$

In this formula NT/2n will be recognized as the projection factor used to calculate estimates for the universe of the cell. The letter n still represents the number of sampled doctors in the cell. The letter y represents the number of mentions for any sampled doctor, while $\bar{y}$ represents the average

number of mentions per sampled doctor in the cell. The summation extends over all of the sampled doctors in the cell.

Since estimates are computed monthly, this formula applies to the monthly estimates. As mentioned earlier, a quarterly estimate is obtained by adding the pertinent three monthly estimates. Likewise the sampling variance of the quarterly estimate is obtained by adding the variances of the pertinent three monthly estimates.

Letting $\text{Var}\ \hat{(Y)}$ now refer to the variance of the quarterly estimate, the standard error of the estimate is obtained as follows:

$$\text{S.E.}\ \hat{(Y)} = \sqrt{\text{Var}\ \hat{(Y)}}$$

Likewise the relative standard error is:

$$\text{Rel S.E.}\ \hat{(Y)} = \frac{\text{S.E.}\ \hat{(Y)}}{\hat{Y}} = \frac{\text{S.E.}\ \hat{(Y)}}{\hat{Y}} \times 100\%$$

These then are the appropriate variability measures for any region-specialty cell.

In order to obtain the corresponding measures for the national estimate or the estimate for any desired combination of region-specialty cells, the pattern indicated above must be repeated. That is, it is first necessary to calculate the variance for each cell involved and add these variances to obtain the variance of the combined estimate. Then by taking the square root of this variance and dividing the square root

000292

by the estimate itself, we obtain the standard error and relative standard error respectively. Likewise, if the variance is desired for a yearly estimate, the pattern is repeated again. In every case the procedure is to add variances and then calculate the standard errors.

Now strictly speaking, this type of calculation would have to be done for each drug or each diagnosis of interest. A few minutes of sober reflection makes it apparent that the sheer magnitude of this job dictates against its being carried out on any routine basis. However, it has been attempted for all the drug mention data for the first quarter of 1962 in order to obtain an indication of the average standard error for any size estimate. This practice is common for all large sample surveys and has been shown to give sampling errors which are precise enough for all practical purposes.

To this end, then, variances were calculated for each of three months within each region-specialty cell for all drugs mentioned in the first quarter of 1962. Grouping and graphing of these results revealed that on the average there was a straight-line relationship between the logarithm of the variance and the logarithm of the estimate. This relationship was then used to calculate quarterly variances of the national estimates of all drugs mentioned.

Processing of the quarterly variances of the national estimates of all drugs mentioned in the first quarter of 1962 once again revealed that there was, on the average, a linear relationship between the logarithm of the national estimate and the logarithm of the relative standard error of the national estimate. Expanding of these results to a yearly basis made it possible to derive the table on the following page.

000293

YEARLY NATIONAL ESTIMATE (000)	STANDARD ERROR AS % OF NATIONAL ESTIMATE	
	ONE STANDARD DEVIATION (68% LEVEL)	TWO STANDARD DEVIATIONS (95% LEVEL
100	± 28.6	± 57.2
200	± 21.8	± 43.6
300	± 18.6	± 37.2
400	± 16.6	± 33.2
500	± 15.2	± 30.4
600	± 14.1	± 28.2
700	± 13.2	± 26.4
800	± 12.6	± 25.2
900	± 12.0	± 24.0
1,000	± 11.5	± 23.0
2,000	± 8.8	± 17.6
3,000	± 7.4	± 14.8
4,000	± 6.6	± 13.2
5,000	± 6.1	± 12.2
6,000	± 5.6	± 11.2
7,000	± 5.4	± 10.8
8,000	± 5.0	± 10.0
9,000	± 4.8	± 9.6
10,000	± 4.6	± 9.2
20,000	± 3.5	± 7.0
30,000	± 3.0	± 6.0
40,000	± 2.6	± 5.2
50,000	± 2.4	± 4.8

000294

This table supplies approximate standard errors for the national estimate of the number of mentions for any drug in any given 12-month period. It must be remembered that these estimates are not exact; in order to obtain exact estimates it would be necessary to recalculate the formulas given earlier for each drug under study. Nevertheless for practical interpretation of any national estimates, these approximate standard errors should be quite accurate enough.

In deriving the table, the following points were investigated and may help in using the table:

- If any estimate falls between two tabled values, simple linear interpolation will give results of sufficient accuracy. For example, to obtain the relative standard error for a national estimate of 175,000, take 3/4 of the difference between the standard errors for estimates of 100,000 and 200,000 and subtract this from the standard error for 100,000 to get 23.5%. Interpolation on the logarithms of the estimates and their standard errors would give more accurate results, but it is doubtful that the increased accuracy would compensate for the extra complication.

- Although the table was derived for national estimates it can also be used for estimates obtained for particular specialties, groups of specialties or regions. This is true because the basic variance estimates were obtained individually for region-specialty cells, and as mentioned earlier, the estimates for desired combinations of region-specialty cells as well as the variances of such estimates are obtained by adding up the figure for the appropriate cells.

- Some few examples of diagnosis mentions and desired action mentions were checked against the table even though it was derived from drug mention data only. In these cases the table was found to perform quite well. Although it may be necessary to check this out more

thoroughly in the future, at present it is felt that the table will give quite useful estimates of standard errors for these other variables as well as drug mentions.

- The table can also be used to obtain the standard error for the number of mentions of a particular drug for females only, for example. To see why this is true, it is only necessary to recall that such an estimate is obtained in practice by sorting out those cards for which the patient sex is indicated as female and for which the drug of interest is mentioned and then adding up the projection factors for these cards. The basic sources of variability which apply to the estimates of drug mentions in general also apply to this more restricted category of drug mentions for one sex only. It is simply a case of redefining the type of mention of interest just as it is redefined when the number of mentions for a given sulfa drug is studied rather than the number of mentions for a given antibiotic, for example. In this case the combination of one sex and a particular drug is considered to be a different drug than if the drug is mentioned without specifying the sex of the patient. Thus it can readily be seen that the table is applicable to the wide variety of estimates which can be defined in this appropriate manner.

000296

F.3 THE HOSPITAL RECORD STUDY (HRS)*

The Hospital Record Study is a continuing quarterly study of patients, diagnoses, diagnostic procedures, therapy and operative procedures in U.S. short-term general hospitals. It is an attempt to describe statistically the characteristics of general hospital patients abstracted from the Professional Activity Study (PAS).

3.1 Definitions and Types of Information Collected

The PAS case abstract includes a mass of data - not all of which is used in this study. We feel such variables as method of payment, patient race, and discharge status are of marginal usefulness for marketing studies. Thus we are sampling only the following:

- The patient characteristics of age and sex.
- The diagnoses. Most patients have more than one diagnosis, so one is designated as the primary diagnosis--"the final diagnosis explaining admission" is the wording used on the PAS Case abstract.
- The operative procedures. Again many patients have multiple procedures - wherever possible the "most important" procedure is designated.
- Since January 1969 coding for diagnoses and operative procedures has been according to the Hospital Adaption of the International Classification of Disease (H-ICDA), adapted and published by the Commission on Professional & Hospital Activities.
- The type of anesthesia utilized is recorded as inhalation, IV, spinal, saddle block, epidural/caudal, nerve/field block or combinations of these.

* The following information has been excerpted from the Commission on Professional and Hospital Activities and IMS America, LTD: "The Hospital Record Study -- a study of patients in short-term general hospitals."

- Selected drug classes are reported - although not by specific product. Those classes that can be utilized currently in tabulations are oral antidiabetics, insulin, thyroid, steroids, cancer chemotherapy, diuretics, antihypertensives, vasodilators, cardiac regulators, anticoagulants, antibiotics, other antiinfectives, tranquilizers, RH immune globulin, vasopressors and inhalation therapy.

- Additional therapy which can be examined: oxygen, parenteral fluids, plasma blood derivatives, blood transfusion and IPPB.

- Diagnostic procedures are routine for most hospitalized patients. Those which are tabulated include:

  - Urinalysis tests, bile/urobilinogen, kidney function, hormones, calcium and other minerals;

  - Screening tests, STS (syphilis), chest survey, tonometry;

  - Hematology, hemoglobin, white cell, differential, red cells, hematocrit, sedimentation rate, bleeding coagulation time, platelets, reticulocytes/nucleated RBC's, red cell abnormality;

  - Blood chemistry, nitrogen derivatives, calcium/phosphorus, Na/K/Cl/CO_2/pH, liver function, prothrombin time, transaminase/LDH, proteins/electrophoresis, cholesterol/lipids, blood iodine, amylase/lipase/absorption tests, serum iron, arterial blood gases;

  - Blood sugar tests;

  - Serology, special human antibodies, bacterial/viral antibodies, rheumtoid factors;

  - Microbiology, bacterial smear, culture (throat/nose, blood, urine, sputum,wound), antibiogram, parasitology;

  - Histology, cervical pap tests, other type of paper, frozen section;

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- Gastric stool, stool for blood, stool analysis;

- Function, EKG, EEG, thyroid pulmonary function, gastric;

- Radiology of the chest, resp. system, skeleton, upper GI and small bowel, lower GI, biliary, urogenital area, pleural and peritoneal cavity NOS;

- The use of radioisotopes; and

- Others to include skin tests, spinal fluid analysis, toxicology.

It should be pointed out that the results of these tests are not generally recorded, only the fact that they took place. In addition, if a given test is repeated during a patient's stay, this fact is not recorded.

- Tests reported in The Hospital Record Study represent only that portion of hospital diagnostic testing performed for bed patients.

- The hospital service is abstracted. Since the names of services do not always agree from hospital to hospital, the PAS staff assign patients into one of five general service categories (medical, surgical, OB/GYN, pediatric medicine, newborn), using the primary diagnosis or most important procedure, if operated.

- The use of certain types of mechanical equipment is tabulated. Included here are monitoring devices, cardiac pacemakers/defibrillators and IPPB's. Tests such as endoscopic or radiographic examinations are also covered.

- The patient's length of stay, calculated in number of days, is available for all operations and diseases.

- The hospitals contributing data are characterized by type of ownership, bed size, and region of the U.S.

000239

- Only "bed patients" are included in the study; no clinic or emergency ward patients are represented, unless later admitted as bed patients.

- Data are projected to the universe of all U.S. short-term general hospital patients. Add 000 to all estimates.

- Estimates are rounded to the nearest thousand. A dash (-) indicates no data. A plus (+) indicates a numeric estimate of 1-499.

- The cut-off for diagnosis and procedure pages is 10,000 patients (projected) in each instance. There should be a detailed set of tabulations for every disease or procedure shown in the aggregate statistics to be of this magnitude.

- Note that disease estimates distinguish between diagnoses of "primary" and "secondary" importance. Most hospital patients have several disorders; the total number of diagnoses, therefore, is considerably higher than the total number of patients. The total of primary diagnoses equals the total number of patients. The same is true of procedures.

3.2 Sampling Design

The Hospital Record Study is, as the name implies, a study of hospital patient records. The sample data upon which this report is based were drawn from over 750 U.S. non-Federal short-term general hospitals and projected to represent all patients discharged from this type of hospital. The universe is shown below by bed size, region and hospital ownership. Certain types of hospital in the U.S. are not included in the study; not represented are mental hospitals, VA hospitals, military hospitals, or long-term hospitals.

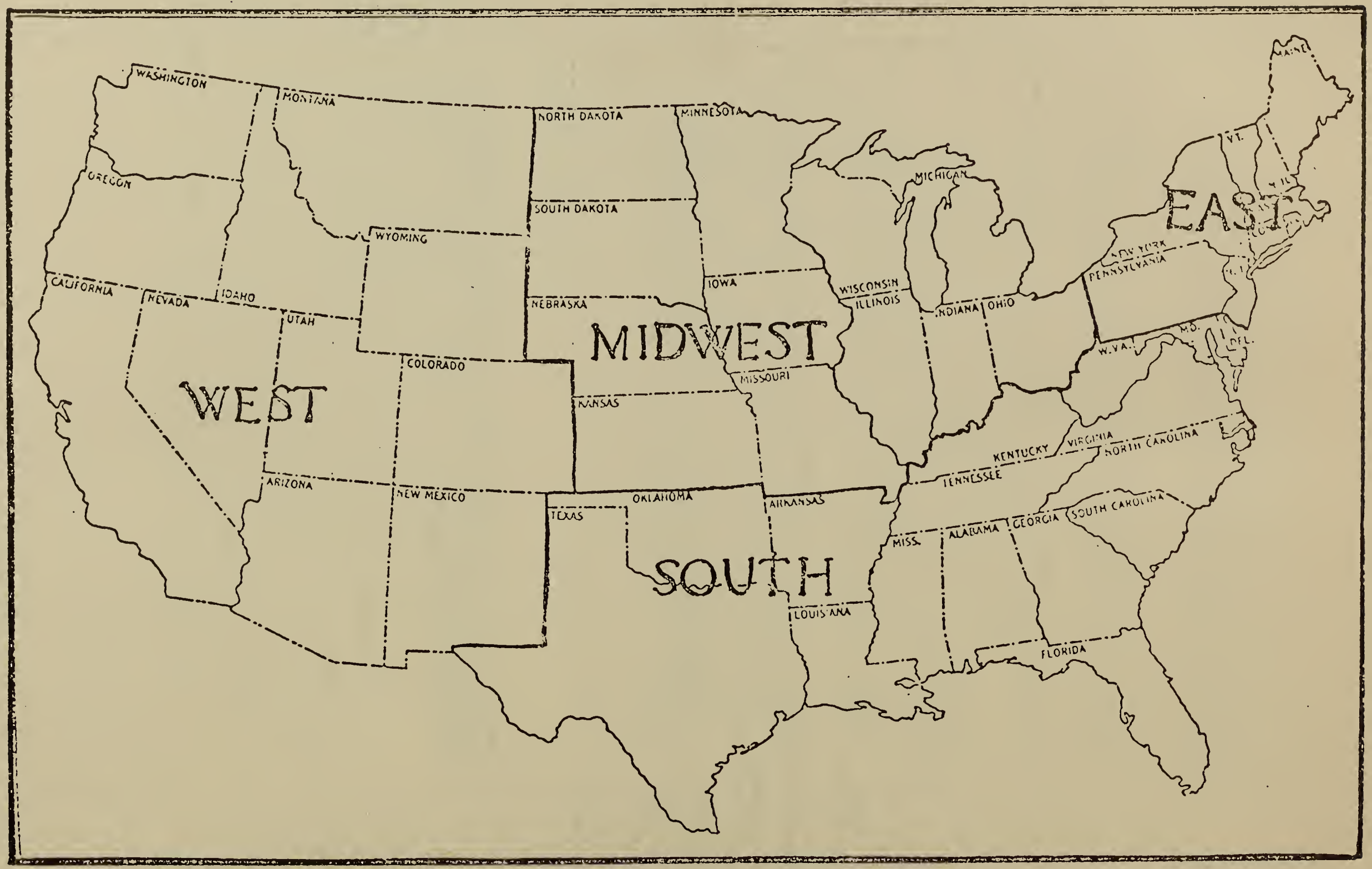
UNITED STATES HOSPITALS BY REGION, CONTROL AND TYPE

	SHORT TERM GENERAL								
	PRIVATE				GOVERNMENT (non-Federal)				
BEDS	1-99	100-199	200-399	400+	1-99	100-199	200-399	400+	TOTAL
EAST	228	228	294	102	19	25	14	18	928
MIDWEST	561	292	267	133	366	86	30	21	1756
SOUTH	706	288	182	89	618	144	60	47	2134
WEST	446	182	127	36	250	38	28	12	1119
TOTAL	1941	990	870	360	1253	293	132	98	5937

Source: The "1972 Annual Survey of Hospitals," Master Facilities Inventory Tape developed by the National Center for Health Statistics.

000301

Map Representing Regional Basis for HRS Sampling



000302

Hospitals show differing rates of utilization of their available beds. Depending upon size, location and management, utilization rates range between 30% and 98%. Thus the number of patient discharges is more important than numbers of beds in sampling hospital patients. Patient discharges, stratified by region, hospital size and ownership are used as stratification factors in the design of this sample. Patient discharges from short-term general hospitals during 1974 break down as in the following table.

The computer tape files of the Commission on Professional and Hospital Activities, Ann Arbor, Michigan, contain summarized information on nearly 40% of the patients discharged in non-Federal short-term hospitals--almost 13 million patients annually. For purposes of The Hospital Record Study, patients are selected from the Commission files exactly in proportion to the breakdown of discharges shown above. Thus if 9% of total patients are discharged from eastern private hospitals of 200-399 beds, then 9% of the patients studied in sample data will also come from these hospitals. Some 400,000 patients are selected annually for the study tabulations, using a nonbiasing, every nth record, technique.

3.3 Projection and Sampling Error

Because patient records are sampled proportionately from each cell of the sampling frame, the projection factor is the same throughout. The average projection factor for the three months of 1975 is 90.4. All tabulations in this report are given as projections representing the total universe. The number of sample cases can be found by taking the projected

000003

Discharges: U.S. Short-Term General Hospitals by Region, Selected Control and Bed Size, 1972

CONTROL	THE UNIVERSE							
	PRIVATE				GOVERNMENT*			
BEDSIZE	1 - 99	100 - 199	200 - 399	400 +	1 - 99	100-199	200-399	400 +
EAST	492,004	1,220,910	3,060,226	2,024,255	40,749	122,996	139,763	351,523
MIDWEST	968,141	1,498,700	2,862,765	2,728,884	642,230	431,878	299,164	432,567
SOUTH	1,363,322	1,641,211	2,165,719	2,072,698	1,198,846	845,554	748,431	1,053,915
WEST	975,014	1,092,578	1,583,405	737,986	357,515	224,268	313,113	294,583
U.S TOTAL	33,984,913							

* Excludes hospitals under control of the Federal Government.

SOURCE: The "1972 Annual Survey of Hospitals," Master Facilities Inventory Tape developed by the National Center for Health Statistics

000204

estimate and dividing by 90.4 (i.e. an estimate of 90.4 thousand in the report projected from 1,000 sample cases).

All estimates are subject to sampling error. The table below gives the approximate size of the error at the 95% confidence level. For example, 95% of the time an estimate of 100,000 will have an error within the range of ± 5.6%.

Approximate Sampling Error at the 95% Level of Confidence

Projected Estimate (000)	Error (as % of estimate)	Projected Estimate (000)	Error (as % of estimate)
4	± 28.0%	80	± 6.30%
5	± 25.	90	± 5.9
6	± 23.	100	± 5.6
7	± 21.	200	± 4.0
8	± 20.	300	± 3.3
9	± 19.	400	± 2.9
10	± 18.	500	± 2.6
11	± 17.	600	± 2.4
12	± 16.	700	± 2.3
13	± 15.	800	± 2.2
14	± 15.	900	± 2.1
15	± 14.	1000	± 2.0
20	± 13.	2000	± 1.5
25	± 11.	3000	± 1.4
30	± 10.	4000	± 1.2
35	± 9.4	5000	± 1.2
40	± 8.8	10000	± 1.1
50	± 7.9	15000	± 1.0
60	± 7.2	20000	± 0.98
70	± 6.7	25000	± 0.96
		30000	± 0.94

000305

F.4 THE THIRD NATIONAL CANCER SURVEY

For information pertaining to the Third National Cancer Survey's population, definition of terms, data collection methodology and diagnostic classification consult the reference document entitled "The Third National Cancer Survey Advanced Three Year Report 1969-1971 Incidence (excluding carcinoma in situ)"[1]

[1] U.S. Department of Health, Education, and Welfare, National Institutes of Health, National Cancer Institute, Biometry Branch: The Third National Cancer Survey Advanced Three Year Report 1969-1971 Incidence (excluding carcinoma in situ), Department of Health, Education, and Welfare Publication No. (NIH) 75-637, U.S. Government Printing Office, Washington, D.C., February, 1974.

000306

F.5 CONSUMER PRODUCT SAFETY COMMISSION*

The National Electronic Injury Surveillance System (NEISS) is an injury data collection system composed of a representative sample of hospital emergency rooms distributed throughout the continental United States. Information drawn from this system is used in making national projections on all product-related injuries by the Consumer Product Safety Commission (CPSC).

5.1 Definitions

The NEISS definition of injury is trauma requiring medical care in an emergency room. NEISS data indicate that a product was involved in an injury, but not necessarily that the product caused the injury.

5.2 Data Collection Methodology

Surveillance begins when the injured person is admitted for treatment to any one of the 119 participating hospital emergency rooms. Basic information is obtained about the accident by the admissions clerk and is written on the emergency room record.

A hospital employee designated and trained by the Commission as a data coder/transmitter reviews records daily for those injuries involving consumer products and transcribes coded equivalents for all relevant data to a NEISS coding sheet. The coded material consists of the hospital record number, age and sex of victim, the diagnosis and body part affected (for

the principal injury), disposition, primary product code, secondary product indication and accident or incident location.

At the end of each day's coding, the data coder/transmitter, often a member of the hospital's medical record department, types the coded data into a teletypewriter-terminal installed by the Commission for this purpose. While typing, a perforated paper tape is automatically punched with the coded data on each case. This perforated tape is then loaded in a special "reader" on the machine.

During late night hours of low telephone line traffic, a special switching device attached to the Commission's computer in Washington automatically polls each of the hospital-based terminals. This device turns on each machine and reads the perforated paper tape at high speed, edits the data for accuracy and completeness, and records the data in the computer. Each morning the computer prepares summary registers and details case printouts for Commission review.

5.3 Sample Design

The NEISS frame was limited to those U.S. hospitals which had emergency treatment units in 1967, as determined by the American Hospital Association. A total of 4,906 hospitals met this criterion, after excluding long-term and federal prison hospitals.

000308

The Census Current Population Survey design with 1960 U.S. population was adopted in the sampling plan used in the selection of NEISS hospitals. The 3,100 counties and independent cities recorded for the U.S. in 1960 were combined to form 1,900 primary sampling units. Each of these units included one or more contiguous counties heterogeneous with respect to economy, industry, agriculture, Hagood index, and proportion non-white. The 1900 primary sampling units were in turn combined to form 357 strata. Each of these strata included one or more primary sampling units homogeneous with respect to rate of population change, percent of urban population, percent of manufacturing population, principal industries, retail trade value, proportion of non white population. The 357 strata were in turn combined to form 100 superstrata. Each superstrata included one or more strata homogeneous with respect to the characteristics used to combine the primary sampling units into strata.

Within each of the four Census geographic regions, the superstrata were ranked in descending order according to the regions. Each of the blocks was approximately equal in population size. A stratum from each superstrata was selected with probability proportional to population. Hospitals selected from the strata were ranked within each block in descending order of emergency room visits. The blocks were further divided into three subblocks, the first representing 50% of the total emergency cases, the second 30%, and the third 20% of the total emergency room visits for that block. More homogeneity with respect to size was thus achieved for hospitals within each subblock. Final selection of participating hospitals within each subblock was then made with probability of selection proportional to the number of emergency room visits.

000309

5.4 Diagnostic Classification

NEISS employs a 4 digit identification code, the first 2 digits representing 1 of 19 general categories, e.g. "General Household Appliances." The second two digits represent specific product descriptions within the categories.

PRODUCT	
CODES	DESCRIPTIONS
01	GENERAL HOUSEHOLD APPLIANCES
02	Washing Machines with Wringers
18-20,28	Water Heaters
02	KITCHEN APPLIANCES
15,28,30,31,33,58	Blenders, Mixers, Choppers, & Grinders (Elec.)
See Footnote 1	Cooking Ranges, Ovens, & Equipment
See Footnote 2	Counter-Top Appliances
38,39,47,55	Irons
08-11,27,45,46	Refrigerators & Freezers
03	SPACE HEATING, COOLING & VENTILATING APPLIANCES
09-11,18,22,26-29,35	Furnaces & Floor Furnaces
See Footnote 3	Space Heaters & Heating Stoves
04	HOUSEWARES
05	Coffeemakers & Teapots, Unpowered
07	Cutlery, Unpowered, 'Kitchen Knives'
24	Drinking Glasses, Glass
56-58	Pots & Pans (Inc. Lids)
18,37	Tableware & Accessories
05	HOME COMMUNICATION, ENTERTAINMENT & HOBBY EQUIP.
See Footnote 4	Sound Recording & Reproducing Equipment (Elec.)
01,16-18,28,41,42	Television Sets
06	HOME FURNISHINGS AND FIXTURES
84,85	Appliance & Extension Cords
11	Bathtub & Shower Structures
01,61,94	Beds (Including Springs & Frames)
12,13,76	Carpets & Rugs
05,0705	Electrical Fixtures (Outlets, Circuit Breakers)
18-20,88,96	Ladders & Step Stools
26-28,86	Lamps, Light Fixtures, & Chandeliers (Electric)
44,71	Non-Upholstered Chairs
48,49	Plumbing Fixtures
04,30-32,64,92,93	Storage Furniture
45,46,82,83	Tables, Non-Glass
02,70,79-81	Upholstered Furniture
07	HOME ALARM, ESCAPE, AND PROTECTION DEVICES
01-04,06-08	All Products Except 0705
08	HOME WORKSHOP APPARATUS, TOOLS, AND ATTACHMENTS
49-51	Batteries, All Kinds
27	Hammers
01,24,32,41-44	Home Workshop Saws (Electric)

000310

09	HOME AND FAMILY MAINTENANCE PRODUCTS
See Footnote 5	Cleaning Agents, Caustic Compounds
See Footnote 6	Household Chemical Products, Other
10,11,40,41,1247	Liquid Fuels, Kindling & Illuminating
07,08,13,15,24,33,37	Paints & Solvents
04,05,31,48	Waxes & Polishes
10	FARM SUPPLIES AND EQUIPMENT
09,29,30,32,50	Combine, Threshing Machine, Harvesting Equip.
11	Farm Elevator, Conveyor
04	Farm Tractor
10,45-47	Picker or Picker-Sheller
05	Power Take-Off
11	PACKAGING AND CONTAINERS FOR HOUSEHOLD PRODUCTS
03,04,12	Cans (Inc. Self-Openers & Resealable Closures)
18,21	Glass Bottles & Jars
22	Glass Containers (Malt Beverages)
20	Glass Soft Drink Bottles (Carbonated Beverages)
09,14	Paper & Cardboard Objects, Wrapping Products
01	Pressurized Containers, Aerosol Containers
12	SPORTS AND RECREATIONAL EQUIPMENT
04	Baseball, Activity, Related Equip. & Apparel
05	Basketball, Activity & Related Equipment
02	Bicycles & Bicycle Equipment
10	Fishing Equipment
11	Football, Activity, Related Equip. & Apparel
12,13	Golf Equipment (Inc. Golf Carts)
37	Guns, Gas, Air & Spring-Operated, Inc. BB Guns
33,72	Gymnastics, Activity, & Related Equipment
79,95,96	Hockey Equipment & Apparel
45	Ice Skates
3204	Motor Scooters, Mini Bikes, & Other Such Vehic.
16,98	Snow Skiing & Related Equipment
67	Soccer
78	Swimming Pool Diving Boards
77	Swimming Pool Water Slides
84	Swimming Pool, Not Otherwise Specified
31	Swimming Pools & Associated Equip.
62	Swimming Pools, Above Ground
41-44,89	Swings, Slides, Seesaws, & Climbing Apparatus
17,73,74,99	Toboggans, Sleds, Snow Discs, & Snow Tubing
46	Wading Pools
13	TOYS
05	Cars, Trucks, Non-Flying Airplanes, & Boats
13	Fireworks
08,29,33	Skates, Scooters, & Skateboards
01	Tricycles
27,28,31	Wagons & Other Ride-On Toys
14	YARD AND GARDEN EQUIPMENT
03	Hand Garden Tools
01,18-21,34,36,37	Power Lawnmowers
15	CHILD NURSERY EQUIPMENT AND SUPPLIES
05,08,22	Baby Carriages, Walkers, & Strollers
04,06,13,29,38	Baby Cribs, Gates, & Playpens
18,40,41	High Chairs & Youth Chairs

16	PERSONAL USE ITEMS
04	Cigarette/Pipe/Cigar Lighters
14,44,45	Clothing (Inc. Day & Night Wear)
50	Desk Supplies, Other
16,22,43	Jewelry, Watches, Keys, & Key Rings
30	Money, Paper & Coins, Inc. Toy Money
15,46,47	Outerwear, Footwear, & Clothing Accessories
49,55,56	Pencils
48	Pens & Marking Pens
52	Pins & Needles
01	Razors, Shavers, & Razor Blades
09,34	Sun Lamps & Heat Lamps
17	MISCELLANEOUS PRODUCTS
04	Matches
22,23	Pocket Knives
18	HOME STRUCTURES AND CONSTRUCTION MATERIALS
15,23-26,35-37,0609	Architectural Glass
11	Bricks, Concrete Blocks, Not Part of Structure
22,27,44-49,58	Doors, Other Than Glass Doors
50	Doors, With Glass Panels, Not Storm Doors
34,51,56	Fences, Not Electric, All Types
07	Floors & Flooring Materials
19	Nails, Carpet Tacks, Screws, & Thumbtacks
10	Outside Structures, Inc. Retaining & Ext. Walls
17	Porches, Balconies, Etc.
06	Roofs & Roofing Materials
40,42,43	Stairs, Ramps, & Landings
59	Storm Doors, Not Otherwise Specified
31	Window & Door Sills, Door & Window Frames
32	Wire, Not Electric
19	PRODUCTS COVERED BY EXISTING FEDERAL REGULATIONS
See Footnote 7	Cosmetics
15-18,23	Drugs, Non-Prescription
20-22,24	Drugs, Prescription
08	Pesticides

FOOTNOTES:
01/ 02,04,43,44,50,56,59-62
02/ 12,16,17,19,21-24,29,34,35,41,57
03/ 13,15,23,25,31-33,43,48-55
04/ 02,03,09,10,20,21,38,40
05/ 02,03,16,29,30,34,38,42,45,47,49,50
06/ 06,09,20,21,26,28,35,36,43,46
07/ 2500-2700

000312

F.6 KAISER FOUNDATION HEALTH PLAN, INC., SOUTHERN CALIFORNIA REGION

6.1 Population

Kaiser Foundation Health Plan members from Southern California Region who were discharged from short term hospitals during 1974.

6.2 Diagnostic Classification

U.S. Department of Health, Education, and Welfare, Public Health Service, National Center for Health Statistics: Eighth Revision International Classification of Diseases, adapted for use in the United States, PHS publication no. 1693, U.S. Government Printing Office, Washington, D.C., 1969.

6.3 Data Collection Methods

Information was abstracted from the medical records of the discharged patients of the member hospitals. Codes were then assigned to the abstracted information by record technicians, and then computerized by the research center staff.

000313

F.7 NATIONAL CENTER FOR HEALTH STATISTICS

For information pertaining to the development, design and procedures of the Health Interview Survey (HIS), Health Examination and Nutrition Survey (HANES), Hospital Discharge Survey (HDS), Nursing Home Survey, and the National Ambulatory and Medical Care Survey (NAMCS) consult the references listed below. For further material dealing with sampling errors, definition of terms, qualification of data, non-response rates, and facsimile parts of the questionnaires, check particular references cited within Section 3 and Appendix G.

7.1 Health Interview Survey

U.S. Department of Health, Education, and Welfare, Health Statistics from U.S. National Health Survey: Concepts and Definitions in Health Household Interview Survey, Series A, No. 3, compiled by the staff of PHS and Census Dept., September, 1958.

_____, Health Statistics from U.S. National Health Survey: Statistical Design of the Health Household Interview Survey, Series A, No. 2, compiled by the staff of PHS and Census Dept., July, 1958.

_____, National Center for Health Statistics: Health Interview Survey Procedure, 1957-1974, Series 1, No. 11, U.S. Government Printing Office, Washington, D.C., April, 1975.

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_____, National Center for Health Statistics: Health Survey Procedure: Concepts, Questionnaire Development, and Definitions in the Health Interview Survey, Series 1, No. 2, U.S. Government Printing Office, Washington, D.C., May, 1964.

_____, National Center for Health Statistics: Origin, Program, and Operation of the U.S. National Health Survey, Series 1, No. 1, U.S. Government Printing Office, Washington, D.C.

7.2 Health and Nutrition Examination Survey

U.S. Department of Health, Education, and Welfare, National Center for Health Statistics: Plan and Operation of the Health and Nutrition Examination Survey U.S. 1971-73, Series 1, No. 10a, U.S. Government Printing Office, Washington, D.C., February, 1973.

_____, National Center for Health Statistics: Plan and Operation of the Health and Nutrition Examination Survey U.S. 1971-73, Series 10, No. 10b, U.S. Government Printing Office, Washington, D.C., February 1973.

_____, National Center for Health Statistics: Preliminary findings of the First Health and Nutrition Examination Survey, United States, 1971-72: Dietary Intake and Biochemical Findings, DHEW publication No. (HRA) 74-1219-1, U.S. Government Printing Office, Washington, D.C., 1974.

000315

7.3 National Survey of Nursing Homes

U.S. Department of Health, Education, and Welfare, National Center for Health Statistics: Design and Methodology for a National Survey of Nursing Homes, Series 1, No. 7, U.S. Government Printing Office, Washington, D.C., September, 1968.

7.4 Hospital Discharge Survey

U.S. Department of Health, Education, and Welfare, National Center for Health Statistics: Design and Methodology of the 1967 Master Facility Inventory Survey, Series 1, No. 9, U.S. Government Printing Office, Washington, D.C., January 1971.

_____, National Center for Health Statistics: Development and Maintenance of a National Inventory of Hospitals and Institutions, Series 1, No. 3, U.S. Government Printing Office, Washington, D.C.

_____, National Center for Health Statistics: Development of the Design of the NCHS Hospital Discharge Survey, Series 2, No. 39, U.S. Government Printing Office, Washington, D.C., September, 1970.

_____, National Center for Health Statistics: The Agency Reporting System for Maintaining the National Inventory of Hospitals and Institutions, Series 1, No. 6, U.S. Government Printing Office, Washington, D.C., April, 1968.

000316

7.5 National Ambulatory Medical Care Survey

U.S. Department of Health, Education, and Welfare, National Center for Health Statistics: NAMCS Background and Methodology, Series 2, No. 61, U.S. Government Printing Office, Washington, D.C., April, 1974.

_____, National Center for Health Statistics: Preliminary Data from the National Ambulatory Medical Care Survey, Series 13, No. 21, U.S. Government Printing Office, Washington, D.C., October, 1975.

000317

APPENDIX G

POPULATION TABLES

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Population Tables

In this section several population tables are presented which represent suitable denominators for the computation of incidence rates, prevalence rates, and rates of utilization of medical services. These are not official estimates of the Bureau of the Census but, in most cases, were prepared by the Bureau of the Census for the use of NCHS as appropriate denominators and published by NCHS in one or another of the Vital and Health Statistics Series or supplied by NCHS for use in this study. An exception is the estimate of the 1972 institutional population which was provided directly to Westat by the Bureau for use in this study.

000021

Average 1970-73 Civilian Non-institutional Population of the United States (in Thousands) 1/
(For use with incidence table)

Age	Both sexes	Males	Females
All Ages	203,034	97,886	105,148
0-4 yrs.	17,486	8,931	8,555
5-14 yrs.	39,970	20,339	19,631
15-24 yrs.	35,738	17,215	18,523
25-44 yrs.	48,254	23,238	25,016
45-64 yrs.	41,957	19,922	22,035
65+ yrs.	19,630	8,242	11,388

1/ Based for the most part on figures published in the Health and Vital Statistics Reports except that the institutional population data were estimated for this study by the Bureau of the Census.

000322

Civilian Population of the United States (in Thousands): 1972
(For use with prevalence tables)

Residence Class	Sex	All Ages	0-64 Years	65+ Years	White	Other
Non-institutional 1/	Total	204,148	184,225	19,924	178,727	25,421
	Males	98,445	90,143	8,301		
	Females	105,704	94,081	11,623		
Institutional 2/	Total	2,198	1,185	1,013	1,840	358
	Males	1,156	831	325		
	Females	1,042	354	688		
Total Civilian	Total	206,346	185,410	20,937	180,567	25,779
	Males	99,601	90,974	8,626		
	Females	106,746	94,435	12,311		

1/ From Series 10, No. 96, in the Vital and Health Statistics Series published by NCHS.

2/ Special estimate provided by the Bureau of the Census.

N.B. Totals do not agree with sums of subtotals because of rounding.

000323

Estimates of the Civilian Non-institutional Population of the United States by Age, Color and Sex (in Thousands) as of November 1, 1973[1]
(For use with ambulatory care tables)

Characteristics	Distribution	Population
Sex	Male	99,546
	Female	106,877
Race	White	180,222
	All Other	26,201
Age	Under 15 Years	55,347
	15-24 Years	37,643
	25-44 Years	50,407
	45-64 Years	42,631
	65+ Years	20,395

1/ Based for the most part on figures published in the Health and Vital Statistics Reports except that the institutional population data were estimated for this study by the Bureau of the Census.

000324

Civilian Non-institutional Population by Age and Sex (in Thousands): United States, July 1, 1972 1/
(For use with hospitalization tables)

	Both Sexes	Males	Females
All ages	204,229	98,511	105,718
Under 15 years	56,609	28,844	27,714
15-44 years	85,445	41,313	44,133
45-64 years	42,248	20,054	22,194
65+ years	19,927	8,300	11,627

1/ From Health and Vital Statistics, Series 13, No. 19, Table II.

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APPENDIX H

LOG OF SOURCES CONTACTED

000327

American Druggist Magazine
Mr. Rubin Feirman, Statistician
New York, New York

Mr. Feirman was contacted for statistical data on the volume of retail prescription and non-prescription drugs sold in the U.S. for the purpose of eye care, for the most recent year available. We were referred to him by the National Pharmaceutical Council, Inc., as a possible data source.

Mr. Feirman had no statistics available on the subject and referred us to IMS America, LTD., Ambler, Pennsylvania.

American Foundation for the Blind, Inc.
Mr. L. Eugene Apple, Executive Director
New York, New York

On March 4, 1975, two members of Westat staff met with Mr. Apple and several members of his staff (Dr. Milton Graham, Mr. William Gallagher, Mr. Robert L. Robins, and Ms. Dorothy Denby). The meeting was held to discuss sources and methods by which statistical data could be obtained on the incidence, prevalence, and cost of blindness and severe visual disorders.

Many sources for data were obtained as a result of our discussion, primarily in the areas of cost of blindness, numbers of optometric service, state surveys on blindness prevalence, and agencies which produce a variety of blindness-related data. Westat staff pursued the most relevant of these sources for data.

Blue Cross/Blue Shield of Maryland
Health Data Service
Ms. Marsha Silvers, Register Record Administrator
Baltimore, Maryland

On April 15, 1975, Ms. Silvers was sent Questionnaire D with a request for its completion and a brief explanation of the study. On April 23, Ms. Silvers responded with a completed questionnaire. Due to limitation on the data available, including an inability to determine an accurate population base, no data were requested from Ms. Silvers.

Blue Cross/Blue Shield of Maryland
Mr. Martin Blair, Assistant Manager,
Program Research and Development
Towson, Maryland

On June 9, 1975, Mr. Blair was sent Questionnaire B as well as an additional request for data on the average cost of charges for services rendered by primary care physicians, ophthalmologists and optometrists regarding surgical operations on the eye, general in-patient care, and out-patient services. In receiving the returned questionnaire, we determined that the most useful data which could be provided would be figures on the average charges for performing certain common operations on the eye.

A table shell was prepared requesting the number and rate of specific eye operations for which payment was made, by age and sex breakdowns, and the aggregate dollars paid by type of operation, for the most recent year available.

In response to our request for completion of the table shell, Mr. Blair provided current information on the number of cases reported and average charges for nine surgical procedures, although age and sex were not differentiated. The ambulatory care data were found to be unavailable,primarily because the data are not routinely coded by diagnosis.

Blue Cross/Blue Shield of
Massachusetts
Mr. Earnest J. Lampron, Director
of Actuarial Statistics Services
Boston, Massachusetts

On January 29, 1975, Westat staff visited Mr. Lampron in order to administer a pretest questionnaire (D) on each of two data collection systems sponsored by Massachusetts Blue Cross/Blue Shield: Medex, for subscribers aged sixty-five and over and/or disabled; and Blue Cross/Blue Shield data collection for the total Massachusetts population subscribing to the plan.

Information provided regarding the Medex search indicated coverage of partial data on episodes of short term hospital and extended care and/or medical services: data by age could not always be supplied, cost statistics covered only the charges over those paid by Medicare, and ICDA codes were limited to three digits, thus limiting the level of detail.

000330

The data collection system for the total Blue Cross/Blue Shield subscriber population in Massachusetts was also limited in its ability to provide age breakdowns. Mr. Lampron indicated up to a six month waiting period necessary to produce the requested data, with the possibility of additional time spent in a Blue Cross committee review.

For reasons indicated above, it was decided not to pursue our request for data.

Blue Cross/Blue Shield of Michigan
Metro Health Plan
Robert H. Reveley,
Executive Director
Alternative Health Care Systems
Detroit, Michigan

On April 14, 1975, a copy of Questionnaire B was mailed to Mr. Reveley along with a request for its completion and a brief background explanation of the study. On April 28, we received a reply from Mr. Reveley which stated that the Metro Health Plan maintained no data collection system or retrieval process which could provide information on the specific nature of treatment for medical disorders. Consequently, no data could be compiled for our purposes.

Blue Cross of Florida, Inc.
Health Data System
Utilization Review Department
Dale Douberly, Manager
Jacksonville, Florida

Mr. Douberly was sent a copy of Questionnaire D on April 14, 1975, with a request for its completion and a brief background on the visual disorders project. No response was received from our original inquiry and a follow-up letter requesting completion of the questionnaire was mailed on May 14. When again no response was received from Mr. Douberly, the data request was not pursued.

Blue Cross of Northeast Ohio
QUEST: Quality, Utilization and
Effectiveness, Statistically
Tabulated
Mr. John R. Mannix, Vice President
Research and Planning
Cleveland, Ohio

A copy of Questionnaire D was sent to Mr. Mannix on April 14, 1975, and when no response was received, a follow-up letter requesting completion of the form was mailed on May 14, 1975. On June 30, a reply was received from Mr. James Kretzschman, for Mr. Mannix, including the completed questionnaire and a copy of the coding sheet used to collect patient information for use in the system.

Since the sample was limited in size and geographical location and since other sources provided data more adaptable to national estimates, we decided not to pursue the request for additional information.

Blue Cross of Wisconsin
Health Service Data
Mr. Kenneth Melkus, Director
Milwaukee, Wisconsin

On April 14, 1975, a copy of Questionnaire D was mailed to Health Service Data in care of Dr. Sidney Shindell, believed to be current Director. On May 20, Dr. Shindell informed us that he had been succeeded as Director by Mr. Melkus two years ago and that HSD had ceased operations in 1974. The HSD program currently functions only in one Milwaukee hospital. Consequently, no further inquiry into obtaining data was made.

California Agriculture and Services Agency
Department of Industrial Relations
Division of Labor Statistics and Research
Ms. Margaret R. O'Grady, Chief
San Francisco, California

On April 28, 1975, we received Ms. O'Grady's completed Questionnaire B, mailed to her on April 14. Data regarding the population represented (employees covered by the California Workers' Compensation Act) were not available by diagnostic breakdown or demographic breakdown and were coded by a special coding procedure (a copy of which was included with the questionnaire). It was decided not to pursue our request for specific data from the agency.

California Department of Health
Center for Health Statistics
Mr. John Keith
Sacramento, California

On June 9, 1975, Mr. Keith was contacted by phone in order to determine several points of information:

1) Could the Center provide data on the number and costs of ambulatory care physician encounters related to eye disorders for the Medicaid population of California?

2) Could the Center provide us with a diagnostic breakdown of eye operations for the same population in terms of numbers and costs?

On June 12, a follow-up letter of confirmation regarding this request was sent. Table shells reflecting the needs of this request were attached. After a brief interim, Mr. Keith indicated that the data that we had requested could be provided with a few minor changes in the initial table shells. Different age groupings and a diagnostic breakdown concurrent with the 1969 edition of the California Relative Value Scale were to be used. In addition, Mr. Keith stated that their system was unable to separate first visits to physicians from the total number of visits. Adjustments were made in our request and an estimate of the cost of the needed data was awaited.

000333

On August 1, we were informed that the cost of our request would be $11,500.00. After further investigation, it was determined that even data on a sample of the population could not be obtained for less than $4,000.00. Since both amounts exceeded the funds available for this purpose in our contract, the request was cancelled.

California Health Data Corporation
George D. Tipp, Jr., Director
Marketing and Customer Relations
Sacramento, California

On April 14, 1975, a copy of Questionnaire D was mailed to Mr. Tipp and returned as "undeliverable" on April 21. An address correction was obtained, the questionnaire was mailed again, and a response received on May 26. While information was provided on the completed questionnaire which indicated the availability of useful data, it was decided that more complete statistical data could be obtained from a larger hospital discharge abstracting system. Therefore, the request for data was not pursued.

Civilian Health and Medical Program
of the Uniformed Services (CHAMPUS)
Mr. Warren Shaw, Statistical Division
Denver, Colorado

On April 14, 1975, Mr. Shaw was sent a copy of Questionnaire B for completion, along with an explanation of the project. When no response was received by May 14, another letter was sent reminding Mr. Shaw of our request for completion of the questionnaire. No response was made to the second request and no further contact was made.

Drug Chain Magazine
Research Department
New York, New York

Drug Chain Magazine's Research Department was contacted by telephone for available information on cost and volume of sales for prescription and non-prescription ophthalmic drugs sold on a national level for the most recent year in which data were collected.

No data was available on the subject of ophthalmic drugs, although Drug Chain was recommended to us as a data source by the National Association of Chain Drug Stores.

General Electric Company
MEDINET Application Operation
J. N. Carro, Information Services
Rockville, Maryland

On April 28, 1975, Mr. Carro responded to our Questionnaire D, mailed to him on April 14. He indicated that, at present, the MEDINET system does not offer a data collection system which would furnish the type of data which we requested.

Hyman Goldstein, Ph.D.
Research Statistician
Maternal and Child Health Program
University of California
Berkeley, California

On June 19, 1975, Dr. Goldstein was contacted by telephone for a general discussion of the available statistical data related to blindness and was requested to forward to us several pertinent papers or reports which he has authored on the subject of blindness incidence and prevalence, of which we had not previously heard. It was learned that Dr. Goldstein has continued to study and write on the subject of blindness statistics since he left the National Institutes of Health.

Dr. Goldstein was extremely helpful in sending copies of three papers which provided discussions of statistics on blindness statistics in the U.S. and which correlate some of the most recent data from the MRA system. Titles of the papers authored by Dr. Goldstein and sent to us are:

1) "Incidence, Prevalence and Causes of Blindness," reprinted from Public Health Review, Vol. III, No. 1, pps. 5-37, 1974.

2) "Incidence, Prevalence and Causes of Blindness in Selected Countries," reprinted from Public Health Review, Vol. I, pps. 41-69, 1972.

3) "The Social Demography of Vision Impairment in the United States" (with Dr. Eric Josephson), reprinted from Public Health Review, Vol. IV, No. 1, pps. 5-38, January - March, 1975.

Group Health Association
Louis J. Segadelli,
Executive Director
Washington, D.C.

On April 14, 1975, a copy of Questionnaire B, with a request for its completion and a brief background of the study, was mailed to Mr. Segadelli. When no response was received, a follow-up letter requesting the completion of the questionnaire was mailed on May 14. The second request for information was not answered and no further attempt was made to contact the data source.

Group Health Cooperative of Puget Sound
Richard Handschin, M.D., Director
Seattle, Washington

On April 14, 1975, a copy of Questionnaire B was mailed to Dr. Handschin with a request for its completion and a brief background statement on the project. The completed questionnaire was returned to us on May 5, 1975.

While it was determined that useful data could possibly be provided from the data collection system, it was decided that more accurate estimates on national statistics could be made from other sources. Therefore, our request for data was not pursued.

Group Health Plan, Inc.
Maurice J. McKay, General Manager
Saint Paul, Minnesota

On April 14, 1975, a copy of Questionnaire B was mailed to Mr. McKay, who responded by mail on April 18. He indicated that the Group Health Plan does not maintain a medical data collection system so that our questionnaire could not be completed.

Harvard Community Health Plan
Joseph L. Dorsey, M.D.
Medical Director
Boston, Massachusetts

On April 28, 1975, Dr. Dorsey returned a completed Questionnaire B mailed to him on April 14. His accompanying letter indicated that, while data meeting our needs were possible through the Health Plan's Medical Information System, the release of that data to an agency outside the Harvard Community Health Plan was a matter of negotiation based on factors not addressed in Dr. Dorsey's reply.

It was decided not to pursue this agency as a data source since national estimates could more effectively by made from other agencies.

Health Insurance Association of America (HIAA)
Mr. David Robbins
Vice President and Controller
New York, New York

By telephone, contact was made with Mr. David Robbins, Vice President and Controller of HIAA. It had been learned that this organization collects data on charges for specific medical services, particularly operations, which are used by member insurance companies to ascertain what claims might be reasonable. Mr. Robbins indicated that our information was correct. However, the Association collects the data as a service to its members and makes the statistics available to others only on a subscriber basis. It was decided to forego the use of this source of data on the charges for eye operations because similar information could be obtained at less cost elsewhere.

Health Insurance Plan of Greater New York
Dr. Raymond Fink, Vice President
and Director of Research
New York, New York

On April 14, 1975, a copy of Questionnaire B was mailed to Dr. Fink and, when no response was received, a follow-up letter requesting the completion of the questionnaire was mailed

000337

on May 14. Dr. Fink indicated, both on the questionnaire and in a follow-up telephone conversation on June 5, that information was no longer routinely coded by diagnosis and considerable expense would be incurred in developing diagnostic and treatment codes and processing the information. Since this was the case, no further request for data was made.

Hospital Utilization Project (HUP)
William A. O'Neil, Associate Director
for Systems and Research
Pittsburgh, Pennsylvania

Questionnaire D was mailed on April 14, 1975, and returned for address correction on April 22. The questionnaire was remailed and, when no response was received by May 16, a follow-up letter was sent to Mr. O'Neil requesting completion of the questionnaire. On May 28, Mr. O'Neil telephoned to indicate that he had lost the original questionnaire and another was mailed to him immediately. The completed form was received on June 9, 1975.

Due to the delay in receiving initial information from the HUP system, and to the difficulty involved in making national projections from the data on hospitals involved in the sample, it was decided that no further request for information would be made.

IMS America, LTD.
National Disease and
Therapeutic Index (NDTI)
Mr. Larry Levin, Director
Ambler, Pennsylvania

Visual Disorders staff visited IMS headquarters on April 2, 1975, and in the absence of Mr. Levin, met with Mr. Sheldon Silverberg, Manager, International Client Service.

000338

One of the topics discussed at the meeting was the possibility of obtaining national data on the numbers of visits to physicians, both general practioners and ophthalmologists, by persons with visual disorders or for preventive care. Such estimates are available by demographic breakdown of the population from the National Disease and Therapeutic Index maintained by IMS.

Since the actual request for IMS data could only be made by an IMS subscriber, it was arranged by the National Institutes of Health, through Dr. Herbert Woolley, that data be ordered. Specifically, computer printouts were requested on the annual average number of visits and first visits to "all physicians" and "Ophthalmologists only" by patient age and sex and by diagnosis (according to an NDTI diagnostic code list provided by IMS) for a five-year period, 1970-74. Charges for this data were quoted at $843.00 and delivery was estimated to be July 1, 1975.

After a slight delay due to computer difficulties, the requested data arrived as ordered.

IMS America, LTD.
National Prescription Audit (NPA)
Mr. Sheldon Silverberg, Manager
International Client Service
Ambler, Pennsylvania

On April 2, 1975, Westat staff visited IMS headquarters and met with Mr. Silverberg. One of the data requests discussed with Mr. Silverberg was for statistics on the volume and costs of ophthalmic drugs sold and dispersed on a national basis. This data is collected by IMS in the National Prescription Audit. It was discovered that at a cost of approximately $3,000.00, Westat could obtain an estimate, based on a national sample, of the current volume and cost of specific over the counter and prescription (both new and refilled) drugs sold in retail pharmacies. The time frame for processing this data was estimated at one month.

Charges for National Prescription Audit estimates were considered more than the budget would allow and consequently, the data were not ordered.

Internal Revenue Service
Office of Tax Analysis
Mr. John J. Wilkins, Acting Assistant
Director, Revenue Estimating Staff
Washington, D.C.

On May 14, 1975, Mr. Wilkins was contacted by telephone for a dollar figure representing tax exemptions for the blind as of 1974. An estimate of that figure was provided, computed on the basis of 1971 data and projected to a 1974 estimate.

Kaiser Foundation Health Plans
Public Affairs Department
Mr. Richard Edwards
Data Request Coordinator
Oakland, California

On April 14, 1975, five Kaiser Foundation Health Plans (located in Oakland, California; Los Angeles, California; Honolulu, Hawaii; Denver, Colorado; and Portland, Oregon) were sent copies of Questionnaire B in order to investigate the availability of prevalence data on eye disorders from one of the nation's largest health care insurance plans. On May 29, we were contacted by telephone by Mr. Richard Edwards of the Public Affairs Department, Kaiser Foundation in Oakland, California, and told that all requests would be coordinated by his office. At this time he stated that only three regions had useful statistical data available for our purposes (Los Angeles - Southern California Region; Oakland - Northern California Region; and Portland, Oregon). Table shells were sent to each of the three plans requesting statistical information in the following categories: estimated average number and rate per year of discharges from short-term hospitals (based on first diagnosis) for visual disorders and blindness by ICDA code, age, race, and sex; estimated average number and rate per year of specific surgical operations on the eye by ICDA code, age, race, and sex; and estimated average number and rate per year of days spent in short-term hospitals for visual disorders and blindness as first diagnosed by ICDA code, age, race and sex.

On July 7, 1975, after several conversations with the staff of the Public Affairs Department on arranging for the data requested, we were notified that Kaiser policy prevented any data from being released to a private contractor. Following considerable discussion by telephone and letter, we succeeded in making clear the nature of the study and were permitted to continue negotiations for the desired data.

On August 11, data from the Portland Region arrived, although no breakdowns for race could be furnished and ICDA codes were grouped instead of recorded separately, as requested. No charge was made for Portland's data. Data from the Southern California Region was received on September 2, at a cost of $300.00. Southern California Region data were not broken down by race, since this item was not available.

After determining that the Northern California Region, for a charge of $600.00, could supply only a computerized index of the cases, thereby requiring additional time and expense of tabulations by Westat staff, the order for that segment of data was cancelled.

Kansas Department of Social Welfare
Division of Services for the Blind
Mr. Harry E. Hayes, Director
Topeka, Kansas

On April 14, 1975, Mr. Hayes was mailed Questionnaire B. Upon completion of the questionnaire, he was asked to provide current statistical data on the number of registrants by age, sex, and race; and the prevalence of specific eye disorders by site, type, and etiology of affection (as coded by the National Society for the Prevention of Blindness' Standard Classification of Causes of Severe Vision Impairments and Blindness, 1966 revision).

After extensive delays due to programmer overloads and processing difficulties, the data were received on August 26, 1975, at no charge.

The Library of Congress
Division for the Blind and
Physically Handicapped
Reference Section
Ms. Hylda Kamisar, Head
Washington, D.C.

On March 15, 1975, Westat staff contacted Ms. Kamisar for a figure on the number of services offered to the blind and physically handicapped, and the cost of such services.

000341

On March 27, 1975, Westat received a listing of budget expenditures for fiscal year 1974, for the Division of the Blind and Physically Handicapped, by type of expenditure. Data were not broken down for the blind only. Also received was a listing by state of "Regional Libraries for the Blind and Physically Handicapped - Reader Use." Itemizations of the use of talking books and Braille reading material during 1973-74 was provided, as well as the number of total readers served, although data were not broken down for the blind only.

Massachusetts Commission for the Blind
Mr. John F. Mungovan, Commissioner
Boston, Massachusetts

Commissioner Mungovan was visited by Westat staff on January 28, 1975, and completed Questionnaire C as part of a series of pretest interviews conducted by in-person visits to various data collection agencies.

Although according to the completed questionnaire there is a very high percentage of completeness of the register (95%), indicating a thorough representation of the state's blind on the register, the system is not computerized. Therefore, a record search for useful data would have required hiring additional personnel to abstract the needed statistical data from the Commission. Since this would entail considerable expense and additional time, it was decided not to request data from this source.

Massachusetts Eye and Ear Infirmary
Dr. Claes Dohlman,
Chief of Ophthalmology
Boston, Massachusetts

On March 24, 1975, Dr. Dohlman was sent a letter requesting data on the annual number of inpatients and outpatients treated at the Massachusetts Eye and Ear Infirmary, the annual number of surgical operations performed on the eye, and the average dollar costs of these operations. In all cases, it was requested that the data be broken down by age, sex, and diagnostic category.

Correspondence with Dr. Dohlman indicated difficulty in obtaining the requested data; however, our letter was referred to the Office of the Hospital Director. Since no information had been received by June 18, 1975, Westat staff contacted the Director's office by telephone. At that time, it was discovered that no information had been prepared.

Upon further consideration of the difficulties involved in using statistics relating to an unknown population base, we decided to withdraw our request for data.

Missouri State Center for
Health Statistics
Missouri Hospital Discharge
Data System
Mr. Wayne Miller
Jefferson City, Missouri

On April 14, 1975, Mr. Miller was mailed a copy of Questionnaire D with a request for its completion and a statement on the background of the study. On April 28, we received the completed questionnaire with a copy of the form used to collect patient information and a copy of the "Uniform Hospital Abstract: Minimum Basic Data Set," which is a source document for the data collection system.

After careful review, it was decided that data more indicative of national estimates could best be found in other sources, and no further requests were made.

Ms. Helen Moorhead
Medical Records Administrator
Office of Biometry and Epidemiology
National Eye Institute
National Institute of Health
Bethesda, Maryland

Ms. Moorhead was visited by Westat staff on March 19, 1975, in order to discuss the collection and manipulation of data from the Model Reporting Areas which she helped coordinate in the 1960's. Ms. Moorhead provided a helpful explanation

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of the MRS system of compiling prevalence statistics on blindness from member state blindness registers and made herself generally available throughout the project for questions relating to the now terminated Model Reporting Area for Blindness Statistics.

National Academy of Sciences
Institute of Medicine
Ruth S. Hanft, Study Director
Washington, D.C.

Westat contacted Ruth Hanft, Study Director at the Institute of Medicine, for information on the cost of specific eye operations. In response to this inquiry a letter was received from the Institute of Medicine stating that they would be able to provide us with information on the fees paid for certain eye operations, as reflected in the Medicare data. Unfortunately, time constraints on this project were such that our data request could not be processed until late January 1976. After careful consideration and discussion with the National Eye Institute, a decision was made to request the Institute of Medicine to provide us with the data with the idea that this information would be submitted to NEI after submission of the final report.

National Accreditation Council for
Agencies Serving the Blind and
Visually Handicapped
Miss Anne L. New
Consultant on Community Relations
New York, New York

A meeting was held with Miss New and two members of the Westat staff for the purpose of obtaining a listing of accredited schools and agencies serving the blind and visually handicapped, the number of persons served, and cost data for those services offered.

Miss New provided us with dollar figures for 1974, on the combined operating budgets of accredited schools and agencies serving the blind and visually handicapped, and a total dollar figure for operating budgets of agencies still unaccredited. An estimate was also given for the cost of services.

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Miss New pointed out those costs which were not included in NAC figures, such as the majority of training for workers with the blind. She also discussed the hazards involved in duplicating cost figures for services to the blind, which often consist of payments by state and federal agencies and can result in counting federal dollars twice.

National Association of
Blue Shield Plans
Actuarial Services
Mr. Jack H. Esterkin, Director
Chicago, Illinois

In mid-February, 1975, a written request was made to Mr. Esterkin for national data on average costs of surgical cases involving the eye covered under the Blue Shield Plans.

On March 5, we were informed that no national data were available on the cost of surgical eye operations due to the substantial variation in charges throughout the country. Mr. Esterkin stated that in order to obtain national estimates of costs for surgical operations on the eye, a "massive study" would be necessary. No such study had been conducted although cost studies of specific surgical procedures--not including ophthalmological operations--have been done in the past.

We also requested data on the number and costs of first visits to ophthalmologists covered under the Blue Shield Plans. Mr. Esterkin indicated that no such data had been collected, since office visits are not covered by the majority of Blue Shield programs.

National Pharmaceutical
Council, Inc.
Washington, D.C.

Contact was made by phone with a representative of the Council to obtain statistical information on the cost and volume of prescription and non-prescription ophthalmic drugs sold per year in the United States.

No statistical data were available on ophthalmic drugs. It was suggested that we contact the American Druggist Magazine as a possible data source.

National Society for the
Prevention of Blindness
Mrs. Elizabeth Hatfield, Statistician
New York, New York

On March 4, 1975, a meeting was held with Mrs. Hatfield and two members of Westat staff. Mrs. Hatfield provided information on several facets of statistical data on blindness and discussed at length her methodology for several of the surveys which have distinguished her as an authority on the subject of blindness statistics.

Also discussed were the data available from state blindness registers and the drawbacks involved in its use. Mrs. Hatfield provided us with a copy of "Estimates of Blindness" and several other documents which she authored, including "Blindness in Infants and Young Children." Many references to reports and publications dealing with blindness statistics were also provided. These references were investigated by Westat staff in the ensuing months of data collection.

New Jersey State Commission
for the Blind
Mr. Joseph Kohn
Executive Director
Newark, New Jersey

On April 14, 1975, a copy of Questionnaire C was sent to Mr. Kohn. Upon receipt of the completed questionnaire, a request for data was made on May 12, 1975, and two table shells were forwarded to Mr. Kohn. We were informed, near the end of May, that the data could be provided in raw form at no charge if keypunching and tabulation could be done by Westat. Since accurate information from several blindness registers was considered desirable, and since New Jersey evidenced a comparatively high level of completeness in its register, it was decided that raw data would be processed at Westat.

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At a cost of $481.48 for computer and staff time, statistics were obtained on the number of persons on the register by demographic breakdowns as of 1970, and prevalence of severe visual impairments by site and type of affection for age and sex as of 1970. Additional data on the same population by vision group, using a functional definition of severe visual impairment, was also provided.

New York State Department of Labor
Dr. Al Pierce,
Division of Research Statistics
New York, New York

On April 14, 1975, Dr. Pierce received a copy of Questionnaire B and a request for its completion along with a letter explaining the visual disorders project. In a reply dated April 23, Dr. Pierce suggested that we contact Mr. Granville Lee, Director of Workmen's Compensation Research & Statistics, for necessary data since the Workmen's Compensation Board of the State of New York was in a better position to meet our needs. Dr. Pierce forwarded our request and questionnaire to Mr. Lee.

Dr. Pierce also provided us with information from a five year (1966-70) analysis of compensated work injury cases (totaling almost 600,000 cases),which indicated the total percentage of all compensated, eye-related injuries and an approximate cost of that compensation.

On May 16, 1975, we received the copy of Questionnaire B completed by Mr. Lee. According to the questionnaire, no data could be provided by diagnostic breakdown and it was decided not to pursue the request for information from his agency. However, Mr. Lee enclosed a copy of "Compensated Cases Closed 1971," Bulletin 27, published by the Workmen's Compensation Board, which contains statistics on the number of accidents (by body part and extent of disability) compensated in New York State, 1971, dollar cost of these accidents (both total and averaged per case) and nature of the injury incurred.

North Carolina Department
of Human Resources
Division of Services for the Blind
Mr. Jack C. Scott, Deputy Chief
Program Evaluation and Statistics
Raleigh, North Carolina

Questionnaire C was mailed to Mr. Scott on April 15, 1975. When no response was received, a follow-up letter requesting the completion of the questionnaire was sent on May 14, 1975. We received the completed questionnaire on June 6, 1975, and information from the response indicated that current data from the blindness register was desirable. Consequently, on June 9, two standard tables were sent to Mr. Scott for completion. Mr. Scott indicated on June 19 that data conforming to our request could be produced by August 1, 1975, at a cost of approximately $75.00.

Data were received as requested in our table formats, after several delays in processing, on August 11, 1975. Final charge was $320.85.

Optical Manufacturers' Association
Mr. Gene Keeney, Executive Director
Washington, D.C.

In an effort to gather cost information on optical goods (eyeglasses, contact lenses, special appliances, etc.), Mr. Keeney was contacted on May 5, 1975, by phone. Mr. Keeney had no available statistics on volume or cost of optical goods, either by type of impairment which required adjustment with artificial correction, or by total optical goods used in the United States. He referred us to the Bureau of the Census, but knew of no Census statistics available on the subject.

At the suggestion of Mr. Jerry Miller, Optical Association of America, Mr. Keeney was reminded of an actuarial study prepared for OMA by Gordon R. Trapnell, Consulting Actuaries, on the cost of eye care in the U.S. based on a 1975 national sample of opticians and optometrists. On May 19, 1975, a copy of the report was received for our use as background reference information only. Permission to quote actual cost statistics or conclusions drawn by Mr. Trapnell was not granted by Mr. Keeney's office since little data were documented in the report. Mr. Trapnell was contacted by phone and,

on being questioned about his survey methodology, instruments used, and analysis of gathered data from which cost estimates were made, refused to offer any information unless retained as a consultant by Westat.

Opticians' Association of
America
Mr. Jerry Miller
Executive Director
Washington, D.C.

Mr. Miller was contacted by telephone on May 5, 1975, in an effort to obtain information on the cost of optical goods (eyeglasses, contact lenses, special appliances, etc.). Mr. Miller was also asked for data on the number of eyeglasses sold, by type of visual impairment which necessitated the correction. He was unable to provide any data in answer to our request and referred us to the Optical Manufacturers' Association for information.

The Organization for Social and
Technical Innovation (OSTI)
Dr. Donald Schon, Past President
Cambridge, Massachusetts

An investigation of data contained in OSTI's benchmark work in reviewing prevalence and costs of blindness in the U.S. entitled "Blindness and Services to the Blind in the U.S.," an NINDB report to the Subcommittee on Rehabilitation published in 1971, was considered extremely relevant to our effort to obtain statistics on blindness. Consequently, Westat staff was interested in the origin and background of statistical data used in the so-called "OSTI Report."

On March 30, 1975, Dr. Donald Schon, former President of OSTI and project leader in charge of the report, was contacted by telephone and asked for specific statistics discussed in the report and for any new information acquired on the prevalence rates of blindness and the associated costs. Dr. Schon was unable to provide either type of information. However, he suggested that we contact Hadi Madjid, economist for the OSTI report.

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On April 1, 1975, Mr. Madjid, who was responsible for the analysis of expenditures related to blindness, was contacted by telephone and asked about his analytical approach to the cost data. Unfortunately, Mr. Madjid was unable to provide any detailed background on the published or unpublished data. He indicated that he had not explored the cost of blindness since his participation in the OSTI report. Although we had hoped that additional back-up data might be available in the files of this study, we had to conclude that such data were no longer available.

Osteopathic College of Ophthalmology
and Otolaryngology
Mr. G. Joseph Strickler
Executive Director
Dayton, Ohio

On March 5, 1975, Mr. Strickler was contacted by mail for information on the treatment of visual disorder patients in contact with doctors of osteopathy. Specifically, a request was made for data in the following areas:

1) annual number of patients treated, by diagnostic category and demographic breakdown

2) annual number of eye-related surgical procedures performed

3) average dollar cost of surgical procedures and patient care by diagnostic category

It was felt that this information would prove particularly useful in making an accurate estimate of the total prevalence of visual disorders, since data on osteopaths are not always included with that of other physicians.

When no response had been received by May 2, 1975, a follow-up letter requesting the data was sent to Mr. Strickler. Our request remained unanswered and on June 3, 1975, phone contact was made with the former director of the College, Dr. A. Martin. Dr. Martin, recently retired from his position at the College, informed us that no attempt at compiling the data we requested had ever been made by the College or the American Osteopathic Association.

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Pharmaceutical Manufacturers Association
Washington, D.C.

Telephone contact was made with a representative of the Pharmaceutical Manufacturers' Association to determine the number and cost of ophthalmic drugs prescribed or dispensed over the counter, on a national basis, for the most recent year in which such data were collected. We were informed that statistics are collected using only gross diagnostic categories. Therefore, no data on prescriptions for exclusively ophthalmic drugs were available. We were referred to IMS, America's National Prescription Audit.

Professional Activity Study (PAS)
Commission on Professional and
Hospital Activities
Project Development
A. H. Spellman, Director
Ann Arbor, Michigan

Questionnaire D was mailed to Mr. Spellman on April 14, 1975, and returned with the desired information on April 29. Consequently, we requested that Mr. Spellman provide data for two table shells which were mailed to him on May 15, 1975. Specifically, statistics were requested for:

1) the estimated average annual number and rate of hospital days (in thousands) for eye disease and injuries (based on first named diagnoses) from PAS for the latest available year, by sex, race, age group, and HICDA code

2) the estimated average number (in thousands) and rate per 1,000 population of discharges from short-term hospitals (based on first named diagnoses) for visual disorders including blindness from PAS for the latest available year by sex, race, age group and HICDA codes.

On May 22, we were notified by a telephone call from Karen Wollens, Health Record Analyst, Project Development Group, that the national estimates which we requested were available from the Hospital Record Study published jointly by the Commission on Professional and Hospital Activities and IMS, America, Ltd., Ambler, Pennsylvania. All requests for data on PAS were referred to IMS, America, Ltd.

Mr. Gordon T. Hirsch, Vice President, Hospital Products, IMS, America, Ltd., was contacted by telephone on May 23, to discuss the tabulation of PAS data, time frame and cost involved. At his request, Mr. Hirsch was sent the two table shells and a copy of the requested ICDA codes on May 27. We were notified on June 2, that the data could be run with the following adjustments: standard age groups used, differed from those requested, sex and age breakdowns could not be cross tabulated, and categories with less than 500 diagnoses were not broken down by demographics. Cost of the data was $1,200.00, with delivery date set at the end of July.

On July 18, the data were received in the form of a computer printout.

Rand Corporation
Health Sciences Program
Marshall A. Rockwell, M.D.
Director
Santa Monica, California

Dr. Rockwell was sent a copy of Questionnaire D on April 14, 1974. On April 18, we received a letter from him stating that Rand does not operate a hospital discharge abstracting system. Therefore, he could be of no help in our study.

Research to Prevent Blindness, Inc.
Mr. Nathaniel Polster
Washington Representative
Washington, D.C.

Mr. Polster was contacted by telephone on March 26, 1975, for information on the national per capita costs of eye care. Mr. Polster indicated that his organization had no data on the subject of costs and referred us to the three sources of information below:

1) the Blue Cross Magazine, Perspectives, First Quarter, 1970, which contains statistical data on the prevalence and costs of blindness in the U.S.

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2) "Blindness in the United States - A Review of the Available Statistics with Estimates of the Prevalence of Blindness and its Economic Impact," by Kenneth Trouern-Trend

3) the published findings of the Department of Health, Education and Welfare for Aid to the Blind, now part of the statistics on Supplemental Security Income.

Each source was investigated by Westat staff and is cited elsewhere in this report.

Retinitis Pigmentosa Foundation, Inc.
Dennis Hartenstine, Executive Director
Baltimore, Maryland

A member of Westat's project staff spoke with Mr. Hartenstine on January 6, 1976 requesting data on the incidence and prevalence rates of retintis pigmentosa. The executive director indicated that their rates were based on information from Sir Duke Elders Book of Ophthamology. They estimated that 5 out of every 1,000 people in the world have retinitis pigmentosa. Since the foundation was unable to provide us with any primary data the contact was not pursued further.

Rhode Island Department of Social
and Rehabilitative Services
State Service for the Blind
Mr. E. Lyman D'Andrea
Administrator
Providence, Rhode Island

Questionnaire C was mailed to Mr. D'Andrea on April 14, 1975, and after a second mailed request for its completion, was returned on May 22, 1975. It was determined from the completed questionnaire that useful prevalence data on blindness could be obtained from the Register and on May 27, 1975, two standard table shells were mailed to Mr. D'Andrea with a request for specific statistical data.

On June 25, phone contact was made with Mr. D'Andrea and we were informed that data would be provided by the end of July. However, on July 21, when a check was made on the due date for the requested data, we were told that the data in question had not been produced since the table shells had never been received. Table shells were re-mailed immediately.

On July 23, Mr. Charles Lynch notified us that the cost for the computerized printout required to produce the data would be $162.00. Data were received on August 1, 1975, in the originally requested format. Data were based on those persons in the registry for the year June 30, 1974 to July 1, 1975.

Ross-Loos Medical Group
J. E. Inhorn, Administrator
Los Angeles, California

A copy of Questionnaire B, with a request for its completion and a brief explanation of the study, was sent to Mr. Inhorn on April 14, 1975. When no response was received, a follow-up letter was mailed on May 14. The letter was returned on May 28, marked "No One at Address by That Name." The request was not pursued.

Steck Data Corporation
Steck Data Processing
Sales Department
Mr. Howard Widmer, Manager
Austin, Texas

A copy of Questionnaire D was sent to Mr. Widmer on April 14, 1975, and returned to us due to the use of an incorrect mailing address, on April 20. A new address was located and the questionnaire was mailed on April 22, 1975. The letter was again returned to Westat on May 1, marked: "Closed - Return to Sender." No one could be reached at Steck Data Corporation and the request for data was consequently terminated.

U.S. Consumer Product Safety Commission
Bureau of Epidemiology
Mr. Kenneth Haase
Assistant Director
Washington, D.C.

A visit was made by Westat staff on April 7, 1975, to Mr. Haase to determine the availability of statistical data on eye injuries (as reported in the National Electronic Injury Surveillance System [NEISS]). It was agreed that data could be estimated from the NEISS survey on the number of product related eye injuries treated in hospital emergency rooms by age and sex breakdowns, and by type of injury. Numbers would be averaged for 1973 and 1974.

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A cost of approximately $600.00 was estimated for the computer printouts which would provide the above statistics on six types of eye injuries presumed to be the most prevalent (such as chemical burns, foreign bodies in the eye) and related to the use of a product (ex: explosion of aerosol cans, contact of caustic substances with the eye). It was arranged that final decision on the purchase of the data, considered by Westat staff to be a useful but ancillary facet of incidence data, would be postponed until the project's budget could be appraised in light of other data needs.

On August 13, the order was reactivated and, with minor alterations in the type of injury classification, (substitution of "puncture wound" for "eye enucleation," separate runs for contusions and haematoma, and the omission of "open wounds" from the classifications available) data were received in printout form on September 5. Final charge was $515.00, for which we received a percent distribution by age and sex (although not cross tabulated, as originally requested) of emergency room patients with product related eye injuries, based on a national estimate for 1973 and 1974.

A separate set of tables was provided on request and free of charge, listing a cross tabulation by age and sex of the hospital sample, by injury classification. This series of tables was not projected to national estimates, due to the cost of weighting the hospital data necessary for such projections. Nevertheless, it was felt that this auxiliary data would be useful in judging differences in types and numbers of eye injuries by age and sex.

U.S. Department of Commerce
Bureau of the Census
Mr. Vincent P. Barabba, Director
Washington, D.C.

At the suggestion of Mr. Ross Arnet, Bureau of Economic Analysis, U.S. Department of Commerce (see following entry), Mrs. Dorothy Turnbull, Business Division, Bureau of the Census, was contacted for the 1974 dollar figure on retail sales in U.S. optical goods stores. Mrs. Turnbull referred us to Mr. Barabba, who was contacted by mail on March 26, 1975.

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On April 17, 1975, Westat received a written reply from Mr. Robert Hagan for Mr. Barabba, in answer to our request. However, due to the small sample used and the large sampling errors involved as a consequence, Mr. Hagan stated that the data were not for publication and did not represent an official estimate of the Bureau.

U.S. Department of Commerce
Bureau of Economic Analysis
National Income and Wealth Division
Mr. Ross H. Arnet, Economist
Washington, D.C.

In order to determine the national level of spending for eyeglasses and appliances used by the visually impaired, Mr. Arnet was contacted by telephone on March 15, 1975, to investigate the usefulness of data gathered on retail and wholesale sales information. Mr. Arnet suggested that we contact Ms. Dorothy Turnbull, Bureau of the Census, who could amplify the most recent dollar figures, found in the February, 1975, issue of the Social Security Bulletin.

U.S. Department of Defense
Armed Forces Institute of Pathology
Department of Ophthalmic Pathology
Dr. Lorenz Zimmerman, Chief
Washington, D.C.

On March 6, 1975, Dr. Zimmerman was contacted by letter, at the suggestion of Dr. Richard Hoover, the study's ophthalmological consultant, to acquire current incidence statistics for specific eye diseases under study at the Institute.

In response to this request, Dr. Zimmerman indicated that meaningful data with demographic breakdowns based on a definable patient population were not available from the Institute. We were told that the Institute serves mainly as a consulting facility for ophthalmologists and pathologists with difficult therapeutic or diagnostic problems. Therefore, the population served is highly specialized and cases studied are not indicative of incidence rates for specific eye diseases which could be projected to national figures. For this reason, our request for data was cancelled.

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U.S. Department of Defense
Office of the Army Surgeon General
Patient Administration Office
Mr. Herbert Ewert, Statistician
Washington, D.C.

Mr. Ewert was contacted by letter on March 26, 1975, with a request for eye-related data based on the results of physical examinations of recruits into the Armed Services between the years 1970 and 1972. Specifically, we requested a report on the total number of rejections based on vision problems or eye disorders by type of disorder, race, and sex.

On April 10, Mr. Ewert responded with an indication that some data were available from a sample of 2,000,000 draftees examined from 1970-72 who were rejected for eye disorders. Charges for the data were estimated at $100.00 to $150.00. However, no diagnostic breakdowns would be provided, and it was noted that the selection of draftees did not represent a random distribution of the national population. On the basis of the limitations of this data, it was decided that we would not pursue this particular request. However, in September 1975, Westat received a copy of Manpower Research Report (No. MA 72-1) entitled "Draftees: Disqualifications for Military Service for Medical Reasons - an Analysis of Trends Over Time," Office of the Secretary of Defense, June 1972, from Mr. Bernard D. Karpinos, who prepared the report. Mr. Karpinos was informed of our need for data by Mr. Ewert. The report contained a table on disqualifications for Military service by diagnosis for the year 1969-70 and included a breakdown of eye diseases and defects. However, no demographic breakdowns were given. Mr. Karpinos, now retired from the government, has been analyzing these data for many years and knows more about them than anyone else.

U.S. Department of Health,
Education, and Welfare
National Institutes of Health
National Cancer Institute
Biometry Branch, Demography Section
Mr. Joseph Scotto, Senior Services
Bethesda, Maryland

On January 8, 1975, Mr. Scotto was visited by Westat staff and completed Questionnaire A as part of the project's pretest of all questionnaires. Based on the information that Mr. Scotto provided, we requested data on the estimated national incidence of malignant neoplasms of the eye by age, sex, and race breakdowns.

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On May 5, Mr. Scotto provided us with a copy of the Third National Cancer Survey's Advance Three Year Report, which contained numbers of cases and age specific rates for malignant neoplasms of the eye and orbit. On the basis of this, Westat would make an estimate of the national incidence for malignancies of the eye.

U.S. Department of Health,
Education, and Welfare
Office of Education
Bureau of Education for the Handicapped
Division of Personnel Preparation
Ms. Josephine Taylor, Program Officer
Washington, D.C.

Ms. Taylor was contacted by letter on March 27, 1975, in order to determine current data on the amount of money spent per year on the training of teachers of the blind and deaf/blind. When no response was received from Ms. Taylor, a follow-up letter requesting the data was sent on May 5, 1975. According to Ms. Taylor, the data requested would not be available until the end of July, 1975. When contacted in late July, we were informed that the data would not be available until November, 1975. However, a figure was provided for 1971-72 funds awarded by the Office of Education for training of teachers of the "visually handicapped" in colleges, universities, and state educational agencies. It was noted that this figure does not represent the full amount of money spent on teacher training; and threfore, is limited in its usefulness in making cost estimates for visual disorders.

U.S. Department of Health,
Education, and Welfare
Public Health Service
Health Resources Administration
National Center for Health Statistics
Dr. Edward Perrin, Director
Rockville, Maryland

As part of Westat's effort to locate data sources relevant to the needs of the contract, we initiated contact with NCHS staff knowledgeable about the Health Interview Survey (HIS), the Health and Nutrition Examination Survey (HANES), the

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Hospital Discharge Survey (HDS), the National Ambulatory Care Survey (NAMCS), and the Resident Places Survey (RPS). On the basis of these meetings, Westat made a request on March 31, 1975, for data from the aforementioned surveys. Coordination of these requests was directed through the office of Dr. Perrin, Director, National Center for Health Statistics and by Ms. Ethel Black, Special Assistant to the Director, Division of Health Interview Statistics. Most of the data were delivered to Westat on July 28, 1975, and the cost of the data processing totaled $670.00.

In the following paragraphs we have set down the specifics for each of the above contacts:

A. Health Interview Survey (HIS)
Mr. Robert Fuchsburg, Division Director

On December 9, 1974, Mr. Fuchsburg was visited by Westat staff and completed Questionnaire A as part of the questionnaire pretest. Due to the depth of coverage of useful information found in the HIS, it was decided to submit several table shells to NCHS for completion.

On March 31, 1975, four tables based on data available from HIS were submitted to the National Center for Health Statistics. Data requested from HIS is as follows:

1) an estimate of the average annual incidence of acute conditions of eye diseases and injuries by ICDA code, cross tabulated by age group, sex and race for the years 1971-74;

2) an estimate of the average annual number of days of disability resulting from eye diseases and injuries by ICDA code, cross tabulated by age group, sex, bed days, days lost from school and days lost from work for 1971-74;

3) an estimate of the prevalence of visually impaired persons by degree of visual impairment, race, age, and sex, for the latest year available;

4) an estimate of the average number and rate of persons with activity limitation and/or mobility limitation reporting visual impairment as the main cause by types of limitation, cross tabulated with sex, age group, and race for the years 1972-73, or 1973-74.

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Westat staff was in close communication with Ms. Black throughout the months of May and June. Data were scheduled for completion in mid-July. Partial data based on the HIS information was received on July 21, 1975, with final data tabulations received by July 27. Data were not broken down by racial group due to the small sample. The table for activity limitation was reported as available for 1972 only. Otherwise, data from the Health Interview Survey was completed as requested.

B. Health and Nutrition Examination Survey (HANES) - 1973
Ms. Jeanne Roberts
Chief, Medical Statistics Branch
Division of Health Examination Statistics

Ms. Roberts was interviewed by Westat staff as part of the questionnaire pretest, and completed Questionnaire A on December 5, 1974. While useful prevalence statistics could be extracted from the survey's data, it was decided not to submit table shells for completion but to utilize statistics already published in survey reports. The most useful data of all, an estimate of the prevalence of legally defined blindness based on a national probability sample of persons subjected to an examination by an ophthalmologist, unfortunately will not be available until after the conclusion of this study.

C. National Ambulatory and Medical Care Survey (NAMCS)
Mr. James Delozier, Chief
Ambulatory Care Statistics Branch
Division of Health Resources Utilization Statistics

On December 5, 1974, Westat staff visited Mr. Delozier to administer pretest Questionnaire A. Since NAMCS could provide very important information for our use, two tables were designed in order to acquire the necessary data.

Data requested from NAMCS were as follows:

1) estimates of the number (in thousands) and rate per 1,000 population of ambulatory care encounters in 1973 for visual disorders and blindness based on the physician's principal diagnosis for all encounters and first visits only, by ICDA code and age group cross tabulated with sex and race.

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2) a frequency distribution per 1,000 total population of ambulatory care encounters in 1973, by the physician's principal diagnosis, ICDA code, age group, and specialty; i.e., ophthalmology, as well as total physician encounters.

Throughout the months of April, May, and June, Westat staff was closely in touch with Ms. Ethel Black. Estimated completion date for all data was set for late June. When NAMCS data had not been received by mid-July, Ms. Black investigated the delay and reported difficulties in data reliability due to the limited sample size when breakdowns by age and sex were computed. Smallness of sample size when age groups and physician specialty were calculated was also a problem in attempting to derive accurate national estimates.

On July 20, 1975, Mr. Delozier was contacted by Westat staff and it was decided to modify our request by grouping ICDA codes in order to increase the size of the sample and provide more reliable data. Office visits by physician specialty could not be obtained for ophthalmologists only; but data for "Surgical Specialty" were provided,which includes opthalmologists, but is not broken down by eye-related encounters.

D. Hospital Discharge Survey (HDS)
Mr. Abraham Ranofsky, Survey Statistician
Hospital Care Statistics Branch
Division of Health Resources
Utilization Statistics

Mr. Ranofsky was visited by Westat staff on December 5, 1974, and completed Questionnaire A as part of the questionnaire pretest. After a review of the questionnaire by Westat, three tables were submitted to the National Center for Health Statistics for completion based on data from HDS. Information was requested on:

1) the estimated average number per year and rate per 1,000 population of discharges from short-term hospitals for visual disorders and blindness as first-named diagnoses by ICDA code, age, and sex for 1972-73 or 1973-74.

2) the estimated average number per year and rate per 1,000 population of short-term hospital days for visual disorders and blindness as first-named diagnoses by ICDA code, age, and sex for 1972-73 or 1973-74.

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3) the estimated average number per year and rate per 1,000 population of surgical operations on the eye by type of operation, race, sex, and age group.

It was estimated by Ms. Ethel Black that HDS data would be completed by the end of June. However, due to heavy requests for usage of computers and data processors, HDS data did not arrive until July 28, 1975.

E. Resident Place Survey (RPS)
Ms. Joan F. Van Nostrand, Chief,
Long-term Care Statistics Branch,
Division of Health Resources
Utilization Statistics

On December 5, 1974, Westat staff visited Ms. Van Nostrand to administer Questionnaire A as part of the questionnaire pretest. After reviewing the completed questionnaire, a request for data from RPS, 1969, was made on March 31, 1975. Two table shells accompanied our request to the National Center for Health Statistics, indicating a need for an estimate of the prevalence of visual disorders in the institutional population by degree of impairment, sex, and age group. Since RPS, 1969, provided data only from nursing homes, a request for similar data for homes for the aged and chronic disease hospitals was also made.

On June 3, 1975, we received several previously published, provisional tables containing useful information on nursing home residents only. It was reported that no new tables could be run from RPS data. Among the tables received, the following provided usable data for our purposes:

1) number of Nursing Home Residents by age, sex, and length of stay since current admission, for the U.S. 1973-74.

2) number of Nursing Home Residents by age, primary diagnosis, at last examination and chronic conditions for the U.S., 1973-74, (includes data on "glaucoma or cataract").

3) number of Nursing Home Residents by total monthly charge for the U.S., 1973-74.

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4) number of Nursing Home Residents with selected conditions or impairments by basic and total monthly charges for the U.S., 1973-74 (includes data on "glaucoma or cataract").

5) average charge and distribution of Nursing Home Residents by age and sex for the U.S., 1973-74.

6) number of Nursing Home Residents with ability to see with and without glasses by age, sex, and race for the U.S., 1973-74.

7) number of institutionalized persons by type of facility from the 1973 Master Facility Inventory (includes "facilities for the deaf or blind").

U.S. Department of Health,
Education, and Welfare
Rehabilitation Services Administration
Office for the Blind and Visually
Handicapped
Mr. George Magers, Assistant Chief
Division of Services to the Blind
Mr. Warren Bledsoe, Consultant
Washington, D.C.

Mr. Magers and Mr. Bledsoe were visited by Westat staff on March 21, 1975, to obtain statistical data on the cost of blindness rehabilitation as well as to discuss sources of blindness data in general.

Several references were supplied, including sources for data on the cost of training teachers for the blind, the cost of support services to the blind, funding for vocational rehabilitation as a result of blindness, cost of services and amount of payments made to blinded veterans, and the amount of tax relief available to the blind. Each source was pursued by Westat staff.

References were given for sources of data on the cost of rehabilitation of the blind and information received as a result is reported in the entry in this section entitled "U.S. Department of Health, Education, and Welfare: Rehabilitation Services Administration."

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Also discussed were various problems in analyzing blindness-related data resulting from the quality and quantity of statistical information available. Among the most serious difficulties encountered in the collection of blindness statistics, based on the experience of Mr. Magers and Mr. Bledsoe, are the lack of data, both prevalence and incidence, which can be projected to accurate national estimates from small sample groups; cost of blindness data, in general, especially the determination of physician fees for eye care; and difficulties in the accurate recording and reporting of prevalence data by state blindness registers since the termination of the Model Reporting Area System in 1971. These and other problematic areas were frequently encountered by Westat staff in the ensuing months of data collection and analysis.

It should be noted here also that Mr. Bledsoe had assisted this study greatly right from its start by lending numerous references and reprints from his extensive files and advising the staff on persons to see. His knowledge of the general area of blindness and the sources of data on it were invaluable.

U.S. Department of Health,
Education, and Welfare
Rehabilitation Services Administration
Office of Human Development
Dr. Andrew S. Adams, Commissioner
Washington, D.C.

Initial contact was made by telephone with Mr. Berwick A. Drews, Budget Officer, on March 31, 1975, for the purpose of obtaining statistical data on the number and cost of blind and visually handicapped persons receiving rehabilitation. On April 3, 1975, we received a letter from Dr. Adams, to whom the request had been forwarded by Mr. Drews, providing us with 1974 rehabilitation data including a definition of those persons eligible to receive rehabilitation services.

On May 21, 1975, Mr. Drews' office was again contacted to ascertain a breakdown of rehabilitation costs by state and federal expenditures. The necessary information was forwarded by the Budget Office.

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U.S. Department of Health,
Education, and Welfare
Social Security Administration
Office of Research and Statistics
Ms. Barbara Cooper, Social Science
Research Analyst
Washington, D.C.

A meeting was held on March 3, 1975, with Westat staff and Ms. Cooper to help determine a general approach in analyzing the costs of visual disorders and to obtain suggestions on sources of data for making cost estimates. Ms. Cooper suggested the use of several government documents for data useful in determining time lost from work due to illness (e.g.: "Economic Value of a Housewife" by Wendyce H. Brody, unpublished report for U.S. Department of Health, Education, and Welfare, Social Security Administration, Office of Research and Statistics, November, 1974). Also discussed were sources of statistics on hospitalization and costs related to eye diseases (e.g.: Civil Service: AETNA and Blue Cross, Blue Shield). Sources of prescription cost data and doctor visit data pertaining to visual impairments were also suggested (e.g.: National Disease and Therapeutic Index, National Health Expenditures). These and other sources recommended by Ms. Cooper were investigated by Westat staff.

U.S. Department of Health,
Education, and Welfare
Social Security Administration
Office of Research and Statistics
Division of Disabilities Studies
Mr. Lawrence B. Haber, Director
Baltimore, Maryland

On December 31, 1974, Westat staff visited Mr. Haber to discuss the possibility of obtaining useful statistical data on the prevalence of visual disorders based on findings from the 1974 Survey of Health and Work Characteristics.

The survey is based on a 1972 sample of 12,000 persons who were disabled in 1970; 6,000 persons not disabled in 1970; and a smaller sample disabled in 1971 only. Results were weighted for greater accuracy in making national estimates.

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It was determined that visual disabilities were coded based on survey questions related to a functional definition of eye disabilities, e.g., "Do you have trouble seeing?", "Is this a problem even wearing glasses?". However, questions related to visual impairments were extremely limited, and no data could be produced by diagnostic category of disease, etiology of the disorder, or severity of affliction. Therefore, it was decided not to request data related to visual disorders based on the survey.

Mr. Haber also provided us with reprints of articles which he authored and which contain limited data on the prevalence of visual impairment as a major disabling condition in men, ages 18-64. Titles of the articles are: "Disabling Effects of Chronic Disease and Impairment," from the Journal of Chronic Diseases, Vol. 24: 469-487, 1971; and "Age and Capacity Devaluation," from the Journal of Health and Social Behavior, Vol. II, No. 3: 167-182, September 1970.

U.S. Department of Health,
Education, and Welfare
Social Security Administration
Office of Research and Statistics
Division of Health Insurance
Statistics Systems and Procedures
Mr. Aaron Krute, Deputy Director
Mr. Gene Stickler, Chief
Baltimore, Maryland

As part of the questionnaire pretest, Westat staff visited Mr. Krute and Mr. Steckler on December 31, 1974, and administered Questionnaires A and B.

Questionnaire A was used to collect information on SSA data for all enrollees in Part B of Medicare from the current Medicare survey. It was found that only two diagnostic categories could be determined from data collected in home interviews (cataract and glaucoma), etiology data were not available, and the coding system used for classification by diagnosis was only a two digit code adapted from the ICDA. Since data were limited for our needs, and related only to the population over 65 years of age, it was decided at this time not to explore any additional information on the available records.

Questionnaire B was administered to survey the type of data collected from the Medicare system. This was based on claims for reimbursement of health care provided to age sixty-five and over, and all those disabled for two years. The study staff was most interested in data from part B insurance under Medicare because the hospitalization data could be secured from other sources, but aside from the current Medicare survey, mentioned above, it appeared that no data relevant to incidence or prevalence could be secured from part B statistics.

Inquiry was made by Westat staff into the possibility of obtaining cost data on services for the visually disabled from the Medicare A and B programs, and we were referred to the Office of Research and Statistics, Social Security Administration. Unfortunately, according to a spokesman from that office, data for our purposes cannot be extracted from the records on hand. In particular, it was supposed that data from the 5-percent Medicare, part B, sample could be useful in determining charges for ambulatory care services and surgery in eye care. However, it was learned that the many difficulties with data from this sample had led to its discontinuance.

U.S. Department of Health,
Education, and Welfare
Social Security Administration
Office of Research and Statistics
Mr. W. Michael Mahoney
Social Science Research Analyst
Washington, D.C.

In order to secure statistics on the number of blind people in the U.S. who receive Supplemental Security Income and on the dollar costs received in payments to the visually disabled, Westat contacted Mr. Mahoney on May 7, 1975. In response to our request for information on the above, on May 16, Mr. Mahoney provided us with a copy of a report containing an advance release of SSI Program Data as of March, 1975. Included were figures on numbers of blind persons in the U.S. receiving federally administered payments and the total dollar amount received. Similar SSI data by state, for the year 1975, was also provided. Data were not broken down by demographic characteristics of the population, as originally desired. No charge was made for the data.

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U.S. Department of Labor
Bureau of Labor Statistics
Occupational Safety and Health Administration
Division of Periodic Surveys
Mr. William Mead, Chief
Washington, D.C.

On January 14, 1974, Westat staff visited Mr. Mead and his associate, Mr. John Inzana, to administer Questionnaire B. Information was requested for the data collection system used under the Occupational Safety and Health Act (OSHA), which is concerned with statistics on work-related illness or injury of U.S. private industrial workers (excluding government workers or individuals self-employed).

It was determined from the questionnaire response that neither useful incidence or prevalence data on visual disorders could be made available through the present system. At considerable expense, a sample of OSHA basic records could be analyzed, but through the Bureau of Labor Statistics, data were not available on population denominators, demographic breakdowns of the sample, or illness/injury coded by a standardized method. Consequently, no data were requested from the system.

Nevertheless, Mr. Mead provided us with several possible data sources, including Dr. Al Pierce, New York State Department of Labor, which were pursued by Westat staff.

Utilization Information Service Program
Massachusetts Hospital Association
Mrs. Marjorie Gurney, Manager
Burlington, Massachusetts

Mrs. Gurney was contacted by mail on April 14, 1975, with a request to complete Questionnaire D. When no response was received, a follow-up letter was mailed to her on May 14, 1975. We received no response to our second request for data and the contact was not pursued.

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Vermont Department of Social Welfare
Division for the Blind and
Visually Handicapped
Mr. Howard E. Walbridge, Director
Montpelier, Vermont

Mr. Walbridge responded to Questionnaire C, mailed to him on April 14, 1975, after a telephone contact by Westat staff on May 16, 1975. In place of the completed questionnaire, Mr. Walbridge sent a record of enrollees on the blindness register from 1963-1973 by age, sex, site, and type of affection and disease etiology. The two latter categories were on a more limited basis than the codes used by NSPB. Since this was the most recent and complete statistical record which could be provided by the register, table shells were not sent to Mr. Walbridge for completion and no costs were incurred for the data received.

Veterans Administration
Department of Budget
Department of Medicine and
Surgery Services
J. P. Travers, Director
Washington, D.C.

Dr. Russell Williams, Director, Blind Rehabilitation, Veterans Administration, was contacted by telephone on April 3, 1975, to provide information on the dollar amount spent in 1974 for rehabilitation aid to blind veterans. Dr. Williams supplied an estimated figure which included operating costs of three blind rehabilitation centers and five psychiatric blind clinics. We were referred to Mr. Travers for written documentation of the cost figures and received a letter supplying the necessary information on June 18, 1975. No charge was made for the information, which was a total cost figure, not broken down by demographic characteristics of the blind veteran population.

000369

Veterans Administration
Department of Medicine and Surgery
Dr. Kenneth Myers
Director of Optometry
Washington, D.C.

On March 31, 1975, a written request was made for data on the dollar amount spent by the Veterans Administration in 1974, on sensory aids to the blind and visually handicapped, at the suggestion of Dr. Russell Williams, Blind Rehabilitation, Veterans Administration. The letter was originally sent to the Director of Prosthetic and Sensory Aids, Veterans Administration.

Our request was routed to Dr. Myers, who supplied us with the requested information on May 5, 1975. Included in the total figure for the FY 1974 dollar amount spent on sensory aids was a breakdown for aids to the blind and repairs, eyeglasses and repairs, and contact lenses. Additional figures on the number of veterans who were eligible to receive the sensory aids were provided by Dr. Myers after a request for such data by phone on May 6, 1975.

Data provided were said to be limited to those purchases of sensory aids at locations specified for sales to veterans; therefore, purchases at all retail stores, even those made by veterans, were not necessarily included in the total dollar figure. No demographic breakdowns could be provided for the veteran population eligible for sensory aids. There was no charge for the data provided.

Veterans Administration
Mr. Conrad R. Hoffman
Controller
Washington, D.C.

On March 31, 1975, Mr. Hoffman was contacted by mail with a request for information on the dollar amount of compensation and pension payments for blind and other visually impaired veterans, as of 1974. Mr. Hoffman responded on April 14, 1975, in a letter stating a total dollar figure paid out during 1974 to veterans for blindness and other visual impairments. A portion of this amount was specified for the legally blind only. No charge was made for these data. Breakdowns of these figures by demographic categories were not available.

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Virginia Commission for the
Visually Handicapped
Mr. Edward R. Musser, III
Director of Research and Statistics
Richmond, Virginia

As part of the questionnaire pretest, Mr. Musser was visited by Westat staff on January 21, 1975, and completed Questionnaire C. After determining that useful data could be obtained, according to the questionnaire, Mr. Musser was contacted by mail on May 13, 1975, with a request for statistical information from the blindness register. Two table shells were enclosed for completion.

On June 19, 1975, Westat received one of the completed tables with information on the number of persons on the register, as of June 1, 1975, by age, race, and sex breakdowns. No charge was made for the data.

Frequent contact by telephone was made with Mr. Musser throughout the months of July and August, to determine whether Table A, requiring data on the number of people on the register by site and type of affection and etiology of severe visual impairment, could be completed from available data in the register.

Westat staff was notified on August 12, 1975, that Table A data could not be completed due to insufficient staffing and programming difficulties. We were told that data tapes could be made available to Westat for a charge of $100.00, providing Westat could program and tabulate the data. Due to the additional costs required in such an effort, and the consequent slippage of the project's time schedule, it was decided on August 14, 1975, that the request for Table A data be cancelled.

Wills Eye Hospital
Thomas D. Duane, M.D., Ph.D.
Ophthalmologist-in-Chief
Philadelphia, Pennsylvania

Dr. Dwayne was contacted by mail on March 6, 1975, with a request for current statistical data in the area of:

1) annual number of inpatients and outpatients treated, by diagnostic category and demographic breakdown.

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2) annual number of treatment procedures performed (e.g.: number and type of surgical operation).

3) average dollar cost of these procedures and average costs of patient care by diagnostic category.

On March 24, Dr. Dwayne informed us that data were being gathered to fill our request as completely as possible and that the information would be mailed to us upon completion. No further contact was made until Westat staff telephoned Dr. Dwayne on June 18, 1975, to inquire about the delay in receiving the data. On July 7, 1975, limited data was received at no charge, including:

1) annual numbers of inpatients and outpatients served. This data was provided without diagnostic categories or demographic breakdowns;

2) 1974 operating room statistics by number and type of surgical operation; and

3) average dollar cost and length of hospital stay for only three of the surgical procedures listed.

Wisconsin Department of Industry,
Labor, and Human Relations
Research and Statistics Bureau
Risk Management Section
Mr. Henry Gmeinder
Madison, Wisconsin

A copy of Questionnaire B, with a request for its completion and a brief explanation of the project, was mailed to Mr. Gmeinder on April 14, 1975, and returned to Westat on April 23. Information was provided on the population in Wisconsin which has sustained a work related injury or illness covered under Workmen's Compensation.

Due to limitation in the sample size and the lack of useful information which could be extracted from the available record, it was decided not to pursue the request for statistical data.

I N D E X*

*In preparing this index it was Westat's and NEI's goal to provide a means of ready reference for the major diagnostic terms and key concepts in this report. A complete referencing of all topics, however, was not our purpose.

Entries set forth in the index parallel the text of the report. The first number of each entry represents the section number, and all other numbers refer to pages within the text. Example: 3-1-5, 4-16 means Section 3, pages 1 through 5; Section 4, page 16.

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